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The International Geography

Let things be—not seem,
I counsel rather,—do, and nowise dream!
EARTH'S YOUNG SIGNIFICANCE IS ALL TO LEARN.
The dead Greek lore lies buried in the urn
Where who seeks fire finds ashes.

Robert Browning.

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M67
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Fellow or Honorary Corresponding Member of the Geographical Societies of London, Edinburgh, Paris, Berlin, Budapest, Amsterdam, Brisbane, and Philadelphia

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AÏTOFF, D., Paris.—THE RUSSIAN EMPIRE.
BAILLIE, A. F., Consul for Paraguay, London.—PARAGUAY, URUGUAY.
BAINES, SIR ATHELSTAN, C.S.I.—THE INDIAN EMPIRE.
BARTON, C. H., Maryborough.—THE CONTINENT OF AUSTRALIA, QUEENSLAND.
BATALHA-REIS, J., London.—BRAZIL.
BERNARD, PROFESSOR A., Algiers.—NEW CALEDONIA.
BERTRAND, PROFESSOR A., Santiago.—CHILE.
BISHOP, MRS., F.R.G.S.—KOREA.
BRYCE, RIGHT HON. J., O.M., F.R.S.—NATAL, TRANSVAAL, ORANGE RIVER COLONY.
CARNEGIE, HON. D. W.—WESTERN AUSTRALIA.
CHAIX, PROFESSOR E., Geneva—SWITZERLAND.
CHISHOLM, G. G., Editor of *The Times Gazetteer*.—THE CONTINENT OF EUROPE, CHINESE EMPIRE.
COLE, PROFESSOR GRENVILLE A. J., Dublin.—IRELAND.
CONWAY, SIR MARTIN.—THE ARCTIC RECORD.
DAVIS, PROFESSOR W. M., Harvard University.—THE CONTINENT OF NORTH AMERICA, THE UNITED STATES.
DICKSON, DR. H. N., Reading.—CLIMATE.
DOWNING, DR. A. M. W., F.R.S., Director of the *Nautical Almanac*.—MATHEMATICAL GEOGRAPHY.
DU FIEF, PROFESSOR J., Brussels.—BELGIUM.
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FERGUSON, THE HON. JOHN, C.M.G., Colombo.—CEYLON.
FISCHER, PROFESSOR T., Marburg University.—ITALY, SPAIN.
FORBES, DR. H. O., Director of the Liverpool Museum.—THE MALAY ARCHIPELAGO.
GOLDSMID, MAJOR-GENERAL SIR F. J., K.C.S.I.—PERSIA.
GREGORY, PROFESSOR J. W., F.R.S., University of Glasgow.—THE PLAN OF THE EARTH, EAST EQUATORIAL AFRICA.
HEAWOOD, E., Librarian of the Royal Geographical Society.—THE CONTINENT OF AFRICA, AFRICAN ISLANDS.
HEILPRIN, PROFESSOR A., Academy of Sciences, Philadelphia.—MEXICO.
HERBERTSON, DR. A. J., Reader of Geography in the University of Oxford.—THE CONTINENT OF ASIA, THE CONTINENT OF SOUTH AMERICA.
HILL, R. T., U.S. Geological Survey.—CUBA, PORTO RICO.
HINDE, CAPT. S. L.—THE CONGO FREE STATE.
HOSKOLD, H. D., Buenos Aires.—THE ARGENTINE REPUBLIC.
HUME, DR. W. F., Egyptian Geological Survey.—EGYPT.
JOHNSTON, SIR H. H., G.C.M.G., K.C.B.—BRITISH WEST AFRICA, BRITISH CENTRAL AFRICA, TUNISIA.
KAN, PROFESSOR C. M., University of Amsterdam.—THE NETHERLANDS, DUTCH NEW GUINEA.

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KOLBE, Rev. Dr. F. C., Cape Town.—(*See Dr. T. Muir.*)
LAPPARENT, Professor A. de, Member of the Institute, Paris.—France (Physical Geography).
MACGREGOR, Sir W., K.C.M.G., formerly Lieutenant-Governor of British New Guinea.—British New Guinea.
MARKHAM, Sir C. R., K.C.B., F.R.S.—Ecuador, Peru, Bolivia.
MASON, W. B., Tokyo.—Japan.
MILL, Dr. H. R.—Geography: Principles and Progress, Land-Forms, The United Kingdom, etc.
MOCKLER-FERRYMAN, Lieut.-Col. A. F.—Nigeria.
MUIR, Dr. T., C.M.G., F.R.S., Superintendent of Education in Cape Colony (and Dr. F. C. KOLBE).—Cape Colony.
MURRAY, Sir John, K.C.B., F.R.S., of the "Challenger."—The Oceans, The Antarctic Regions.
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RAVENEAU, Professor L., Paris.—France (General Geography).
RAVENSTEIN, E. G.—Maps and Map-Reading.
REEVES, Hon. W. P., Agent-General for New Zealand in London.—New Zealand.
REGEL, Professor F., University of Würzburg.—Colombia.
ROBERTSON, Sir G. S., K.C.S.I., M.P., formerly British Agent in Gilgit.—Afghanistan.
RODWAY, J., Georgetown, Demerara.—The West Indies, The Colonies of Guiana.
SAPPER, Dr. K., Coban, Guatemala.—Central America.
SELOUS, F. C.—Southern Rhodesia.
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SMYTH, H. Warington, formerly Director of the Department of Mines in Siam.—Siam.
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WILSON, General Sir Charles W., K.C.B., F.R.S.—Asiatic Turkey.
ZIMMERMANN, Maurice, Paris.—The French Colonies.

PREFACE

EARLY in 1897 I was requested by the publishers to prepare and edit a compact handbook of geography on a new plan, the suggestion being made that each section should be written by a specialist or recognised authority of high standing. Subject to the limitation of getting the whole world into one volume, I was given a free hand. As the value of the work depends so much on its composite authorship, it may be well to explain at the outset how the book was planned and carried out. Every page is new, each section being written expressly for this work and never previously published.

The allotment of space was made after comparing a number of the leading systematic text-books in all languages, and taking account of the area, the population and the degree of accurate knowledge regarding the different countries. The original allocation of space has, however, been slightly altered at the representation of the authors. As the book is intended to appear at first in the English language only, the parts of the world occupied or controlled by the English-speaking nations have been treated more fully than the rest; but without giving the excessive prominence to the native country which is characteristic of books intended only for school use.

The United Kingdom, though occupying much less space than in most English text-books, is treated in greater detail than any other large country. This is because the materials for its geographical description are perhaps more ample and as yet less studied than those of almost any other region. The United States could not be considered in equal detail, but the novel and scientific plan adopted for the chapter dealing with them makes it perhaps the most instructive in the book, and it is also the longest. The countries of Europe, especially those recognised as Great Powers, have also been treated more fully than is usual in English or American books, and from a point of view that cannot fail to throw new light on their nature and people. No part of the world dominated by Western civilisation is viewed as a foreign land; but is opened to study from within.

General rules as to style and method of treatment were drawn up as follows:—

RULES FOR CONTRIBUTORS.

1. Each author should write in the language most familiar to him. The contributions shall be translated under the superintendence of the Editor.

2. Every contribution must be written continuously, not in the form of tables or disconnected sentences. When statistics are given the tables should be placed at the end.

3. The Editor is solely responsible for the final *form* of the work, and in order to ensure uniformity he must be permitted to make any changes in literary style and arrangement of matter which he considers necessary; but authors are held responsible for facts and figures, which are to be approved by them in the final proof.

4. Subject to the possibility of minor alterations mentioned in No. 3, authors are given absolute freedom in their choice of facts and in the relative space devoted to the different divisions of the subject which they undertake.

5. In the description of a country the following order should be adopted:—

(i) The general configuration and geology of the country as a whole, including its river systems, its climate and natural resources, with a very brief outline of the fauna and flora.

(ii) The people as to race, language, history, and mode of government.

(iii) Manufactures, industries, and external trade, laying stress on the main staples of trade, and on the industries peculiar to the country. The system of internal communications.

(iv) Political divisions considered individually, with notices of towns. All towns with populations of 100,000 and upwards must be noticed; and all other towns which are of special importance. Care should be taken in every case where it is possible to indicate in a few words the characteristics of the site which determined the position of the town, or the geographical conditions which minister to its prosperity.

(v) A statistical table, giving the area and population at the last two censuses of the whole country, or in federal countries of the constituent States; the average values of exports and imports for three five-yearly periods, ten years apart, *e.g.* for 1871–75, 1881–85, 1891–95; the chief towns with their population at the two last censuses.

6. The introductory general discussions of mathematical, physical, commercial, political, etc., geography are to be written from a strictly *geographical* point of view, and in a purely *general* manner—*i.e.*, referring only to phenomena or conditions which are not restricted to particular regions. Only the most thoroughly established and vitally important facts should be stated. The object is not to give a treatise on the subject named, but to supply the few general facts and principles necessary to the comprehension of the special geography of individual countries.

7. The general description of a continent must refer only to the largest and most determinative features, and these should be taken in the following order: Coasts, Surface, Geology, Climate, Flora, Fauna, Anthropology, History, including territorial changes of the largest order.

A list of the most eminent geographical authorities was next drawn up, as a rule three names being selected for each subject; and in October, 1897, seventy-nine letters of invitation to contributors were posted, the latest date for receiving the MS. being fixed as July, 1898. Forty-seven of the authors first invited at once agreed to contribute. When a refusal was received a second author was applied to, and nineteen of these accepted. In ten cases a third author had to be applied to, and on three occasions four refusals were received before an affirmative answer. Altogether in order to secure the co-operation of the seventy authors whose work appears, letters, and sometimes many letters, had to be exchanged with 122 persons in all parts of the World from Norway to New Zealand.

Each section bears the author's name. Those which I compiled merely from literary knowledge are noted as "By the Editor," and in them I have to acknowledge the help of Miss E. J. HASTINGS; those under my

name relate to subjects which I have specially studied. The first piece of MS. was received on December 13, 1897; the last not until March 11, 1899. The MS. of fifty-three authors (to seven of whom English is a foreign language) was written in English, that of eight in German, of five in French, and one each in Dutch, Danish, Spanish, and Portuguese.

The foreign contributions were translated, and the whole MS. for the book carefully revised in order to secure as much uniformity of terminology and spelling as possible. Proofs were then sent out to the authors and their corrections given effect to before the final revision in pages. In many cases page-proofs were also submitted to the author.

The most serious editorial difficulty encountered was in the spelling of place-names. An effort has been made to secure a consistent system, but it has only partially succeeded. The transliteration of Russian names was adopted after much consideration; the chief inconsistency it retains is the use of *y* as a consonant before *e* and *a*, and as a vowel before *i*. The spelling of native names in languages without a recognised alphabet has been brought into harmony with the Royal Geographical Society's rules in all cases where the pronunciation is known. Indian names are given throughout the work, almost without exception, in the form preferred by the author of the chapter on India. As an example of the perplexities of spelling, it may be noted that different authors used the words—Mahometan, Mahomedan, Mohammedan, Muhammedan, Musselman, Musalman, Moslem, and Muslim, for the people following the faith of Islam, and sheer despair of deciding as to the best form led to the nearly uniform use of what is certainly the worst—Mohammedan. It is inevitable that some inconsistencies remain uncorrected.

The arrangement of the subject matter in Part I. follows the natural order of the science. In Part II. the order is that of a natural sequence commencing with Europe on account of its historic claims, and taking the countries in geographical order from west and north to east and south. The Russian Empire having to be treated as a whole makes it necessary to anticipate part of the general description of the continent of Asia, which naturally follows, and leads on to Australasia. The Pacific Islands form a natural link with the American continents, and the circuit of the world is completed in Africa, and concluded by the Polar regions.

The index has been prepared with the intention that it should include the name of every place about which any information is given in the text, every geographical term which has a technical meaning, references to the chief resources of countries, and the names of all authors and of the leading geographers cited in the text. But it has been controlled by the omission of casual references, which would occupy space and not repay the trouble of turning up. It is mainly compiled by Mrs. H. R. MILL, whose constant collaboration in all the work of translation and editing has materially shortened the time of preparation of the book.

The illustrations are limited to sketch-maps and diagrams. Views are

excluded from considerations of space alone; it is fully recognised that well-selected pictures are of great value in all geographical descriptions. The numerous sketch-maps are intended to bring into prominence special features not usually shown in atlases, or apt to be lost in the abounding detail of ordinary maps. They must be looked upon as of value only for the limited purpose for which they are put forward. All the maps have been specially drawn (with the exception of the plans of towns supplied by Messrs. J. Bartholomew & Co., which will be recognised by their fulness of detail); they are either original or adapted from official maps or from those published in geographical journals or other scientific works. I have particularly to thank my friend Mr. E. HEAWOOD for the excellent maps he has prepared, and I am also indebted to Mr. B. B. DICKINSON and Mr. A. W. ANDREWS for the drawing of Fig. 242, and to Dr. A. J. HERBERTSON for the map of the rainfall of Europe (Fig. 53). Mr. SKEAPING, of George Newnes, Ltd., Mr. ADDISON, and Mr. J. BATCHELOR have also supplied a number of the drawings, and Messrs. Philip & Son those illustrating Chap. III. After the density of population diagrams had been prepared it was pointed out to me that the idea of representing this condition by the number of points on a square inch had already suggested itself to Mr. Holt Schooling, and been used by him in the *Strand Magazine*, vol. ix.—Jan. to June, 1895. The flags of the nations are introduced on account of the importance attaching to the flag in all countries as the mark of political unity and national individuality; the colonial badges because of the apt manner in which they often give expression to the natural conditions of the region. These have all been drawn by Mr. SKEAPING. The climate curves showing the mean temperature and rainfall for each month in a number of places, have been compiled from the original data by Dr. A. J. HERBERTSON and Mr. P. C. WAITE, Edinburgh.

The statistics following each section were, as a rule, sent by the author; but in a few cases they have been supplied or supplemented from the "Statesman's Year Book." Statistics are given mainly to serve as an index to the growth of countries by the comparison of figures for different dates. It must be remembered that, except for Europe, North America, and the colonies, most of the figures available are only approximate estimates, or sometimes nothing more than expert guesses; and they may be given variously in different sections. In no case are the odd units, tens, or hundreds in population of any importance, and, as a rule, the three first figures of any quantity are all that are of real value for purposes of comparison. The values for countries using a gold standard are expressed throughout in pounds sterling in the English edition and in dollars in the American edition, conversions being made on the basis of £1 = $5.

The lists of Standard Books are intended to give the titles of the best books dealing exclusively with the special subject or region under consideration. A selection of good general books on Geography is given at the end of this preface. Really "standard" books are not very numerous,

and some which are cited occupy their place only in default of better. Care has been taken to exclude the titles of any works known to contain untrustworthy statements; on the other hand, many excellent books, perhaps more worthy to appear than some which have been given, are omitted inadvertently or through ignorance.

I have to acknowledge gratefully the assistance rendered in reading the proofs by Professor W. M. DAVIS and Dr. J. W. GREGORY for the chapter on "Land-Forms," by Dr. J. E. MARR and Dr. J. SCOTT KELTIE for the "United Kingdom," by Dr. G. M. DAWSON, C.M.G., for "British North America," by Dr. FRANCISCO P. MORENO for the "Argentine Republic," and by the Agents-General of several colonies for revising the sections on which they are authorities.

Special thanks are due to Mr. FRANK MUNDELL for his vigilance and care in reading the whole of the proofs, and in facilitating the task of seeing the first edition through the press in 1899.

The results of the various Census Reports for 1900 and 1901 have been incorporated in the later editions, and the chapters have been thoroughly revised by the editor as well as by the authors or by competent specialists, thanks being due in particular to Mr. E. HEAWOOD and Dr. A. J. HERBERTSON for much help. The illustrations have been revised and many of them re-drawn, and the lists of standard books improved.

H. R. M.

62, Camden Square, London, N.W.
July, 1907.

STANDARD GEOGRAPHICAL BOOKS OF REFERENCE

E. Reclus—"Nouvelle Géographie Universelle," 19 vols. Paris, 1876–94. Also a translation, London.

A. Kirchhoff (editor)—"Unser Wissen von der Erde." Vienna, 1876—in progress.

"Stanford's Compendium of Geography and Travel." New Issue. London, 1899–1903.

Vivien de St. Martin and M. Rousselet—"Nouveau Dictionnaire de Géographie Universelle." 6 vols. Paris, 1879–95. Also supplement 1898–1900.

G. G. Chisholm—"The *Times* Gazetteer." London, 1895, (reprint) 1899.

"Encyclopædia Britannica" (Geographical Articles in Supplementary Volumes), 1902.

"Chambers's Encyclopædia" (Geographical Articles). 10 vols. Edinburgh. Latest edition.

J. S. Keltie and I. Renwick—"The Statesman's Year Book." London—Annual.

H. Wagner—"Geographisches Jahrbuch." Gotha—Annual [for trustworthy summaries of geographical progress].

O. Baschin—"Bibliotheca Geographica, herausgegeben von der Gesellschaft für Erdkunde zu Berlin." Berlin—Annual. [Gives a nearly complete list of the geographical publications of the year.]

L. Raveneau—"Bibliographie Géographique Annuelle. Annales de Géographie." Paris—Annual. [An annotated list of the best geographical publications of the year.]

"The Geographical Journal." Published monthly by the Royal Geographical Society, London. [Original records of the most recent travel, and the fullest monthly geographical bibliography and list of maps.]

"The Scottish Geographical Magazine." Published monthly by the Royal Scottish Geographical Society, Edinburgh.

"The Geographical Teacher," London. [The publication of the Geographical Association.]

"The National Geographic Magazine." Published monthly by the National Geographic Society, Washington.

"Journal of the American Geographical Society of New York."

"Journal of Geography." New York. [For teachers.]

"Petermanns Mitteilungen." Gotha—Monthly. [The Standard German geographical journal, remarkable for its excellent maps.]

"Ergänzungshefte zu Petermanns Mitteilungen." Gotha—published occasionally. [These separate numbers contain important geographical memoirs or records of travel.]

"Annales de Géographie." Paris—six numbers annually.

H. Haack—"Geographen-Kalender." Gotha—Annual [Handy summaries of geographical progress, names and addresses of the geographers, and geographical publications of all countries].

"Lippincott's New Gazetteer." London, 1906.

REFERENCE ATLASES.

"Stielers Hand-Atlas." Gotha, 1902–1903. [This finely engraved atlas is also issued in separate sheets. The plates are always kept up to date of publication and very few copies are printed at a time.]

W. and A. K. Johnston—"The Royal Atlas." Edinburgh. [The finest British atlas, but expensive.]

J. G. Bartholomew—"The Twentieth Century Citizen's Atlas." London, 1902. [The cheapest high-class atlas.]

F. Schrader—"Atlas de Géographie Moderne." Paris, 1890.

O. Spamer—"Grosser Hand-Atlas." Leipzig, 1897. [This is based on Schrader's Atlas with additional maps. Both are characterised by the number of their small maps, town plans, etc.]

H. Habenicht—"Taschen Atlas." Gotha. [The most perfect pocket atlas. A new edition is published almost every year.]

"L'Année Cartographique." Paris—Annual. [Maps showing all changes due to the explorations and treaties of the year.]

Vidal Lablache—"Atlas Général." Paris, 1894.

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The International Geography

PART I

PRINCIPLES OF GEOGRAPHY

CHAPTER I.—GEOGRAPHY: PRINCIPLES AND PROGRESS

By Hugh Robert Mill, D.Sc.

The Plan of the Book.—The object of this book is to present in one volume an authoritative summary of the whole of Geography as fully as space permits. The limit of size makes it impossible to treat any part of the subject exhaustively, but by sacrificing such details as may be found better expressed in the maps of an atlas it is possible to give prominence to the essential facts. Like most treatises on geography, this is divided into two unequal and contrasted parts. The first deals with the *Principles of Geography* and their applications in the most general sense. It is compressed into small compass, because the aim kept in view is rather to illustrate the principles by their application to actual cases than to produce a theoretical work. The second part accordingly deals more fully with the *Countries of the World* at the present day; each article involving the application of some or all of the general principles stated in the first part.

The book is neither a Gazetteer nor an Encyclopædia, but is intended to give a readable account of the character of all countries as regards land and people in language which is neither technical nor childish. Such special terms as are necessary for the purpose of exact description are explained in the index.

In the treatment of each country some deviation is made from the general plan common to all, in order to explain the peculiarities of its national life and to bring out its individuality. The structure of the region and its action on the race is the leading motive in the description of old countries; the reaction of the race on the region takes the first place in the description of new lands undergoing development; but in every case the ground-work is a true description of the country as it is to-day. Here, as well as in the avoidance of those errors which beset even the most careful compiler, this book has a special claim to consideration, because, with

few exceptions, each country is treated by an experienced traveller, a resident, or a native. The authorship may indeed be viewed as part of the subject, being itself an outcome of the land described.

Geography Defined.—The literal meaning of Geography—the Description of the Earth—is limited by usage to the description of the Earth's surface; but the sense in which *description* is to be taken in this definition must be explained. That it is a *graphy* and not a *logy* has actually been brought forward by men otherwise worthy of respect as an argument against geography being a science. It need only be pointed out in reply that if a name derived from the Greek is necessarily a definition, astrology should still be held a science. The very first modern text-books of geography insisted strongly on the distinction between Chorography, or Topography, and Geography. A quaint diagram from the "Cosmographia" of Apian and Gemma Frisius in 1584 (Fig. 1), illustrates chorography, after Ptolemy by the metaphor of a small detailed sketch such as that of an eye or an ear, while geography is like the complete drawing of a portrait. The chorography of the old writers has too often been expounded and taught under the name of geography, and hence misconceptions have arisen. Geography is a part of that greater science which was called *Cosmography* in the Middle Ages and *Physiography*[1] in modern times; but it is something more. A formal definition of the modern science may be put thus:

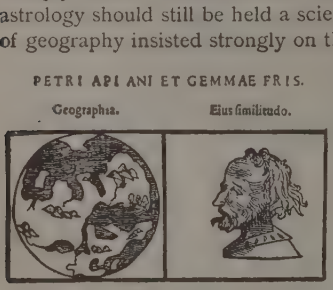

FIG 1.—*An Early Simile of Geography*

Geography is the exact and organised knowledge of the distribution of phenomena on the surface of the Earth, culminating in the explanation of the interaction of Man with his terrestrial environment.

The Position of Geography.—In the field of knowledge geography occupies a peculiar, even unique position. As the meeting-place of the physical and the human sciences, it is the focus at which the rays of natural science, history, and economics converge to illuminate the Earth in its relation to man. It is impossible to treat any natural, much more any human science as a portion of knowledge "clean-cut from out and off the illimitable," for the margins of all sciences are confluent. Geography is akin to physics in its organisation, inasmuch as it is a generalisation, or rather a

[1] Prof. Davis confines the name *physiography* to that department of physical geography which has been termed by other writers *geomorphology*, but the word was used in the general sense by Linnæus about 1736, and was popularised by Huxley in 1877.

synthesis, of units each of which may be viewed as a highly specialised branch of science in itself. The unity of physics results from the fact that the physicist looks on nature in the universal aspects of matter and energy; the unity of geography results from viewing nature in the limited but still general aspect of the phenomena which affect the surface of the Earth. The materials for bringing the generalising science of geography to the dignity of completeness, are not yet all collected; but the plan is already grandly outlined. Incompleteness of data, however, is an incentive to progress, and a guarantee of substantial advance being made when the right direction is foreshadowed by a theory. The theory of geography which gives life and unity to the details of topography, and the various facts borrowed from such cognate special sciences as astronomy, geology, oceanography, meteorology, and history is the far-reaching theory of evolution. Writing in the twentieth century it is scarcely necessary to point out that this theory is not antagonistic to the doctrine of creation. Evolution exhibits a constant succession of changes in a definite direction—from lower to higher, from simple to complex—inevitably suggesting some external guidance, and not touching the question of ultimate origin.

The Departments of Geography.—The subject-matter of geography may be classified in various ways, each representing an aspect from which the whole may be considered, but it is simplest to follow the order of evolution, selecting and arranging the divisions so that the classification becomes a statement of the principles of geography, in which each part depends on that which precedes and conditions that which follows. The fundamental department of geography views the Earth's surface from the standpoint of the one absolute science—Mathematics. It deals with the measurement of the Earth, the whole question of geodesy and surveying, and that of map-projections and map-construction. It takes account also of the strictly calculable phenomena of the Earth's movements and its relations to the other members of the solar system, ascertaining the times of the seasons and of the tides, and fixing the measure of time itself. *Mathematical Geography* presents us with a globe of a definite size, covered for a certain proportion of its surface to a particular depth by an ocean in which tides are raised by external attraction, rotating on a definite and practically unchanging axis and so acquiring the polarity which enables positions to be found both in latitude and longitude by reference to external bodies; the axis being so inclined to the plane of the orbit as to bring the succession of the seasons and the reciprocal swing of day and night differently to every zone of the surface.

This aspect passes directly into that of the less definitely known and less calculable phenomena of *Physical Geography*, which takes account of the differences in material and in function of the parts of the Earth—the rigid lithosphere, the mobile hydrosphere, and the all-embracing atmosphere. Geology, oceanography, and meteorology contribute to supply the

means of understanding the forms and functions of the Earth. The arrangement of the continental ridges above the hollow plains of the ocean, and the forms into which these ridges are wrought, acquire significance. The power of solar radiation calling into movement the currents of water and air, and the deviation in moving bodies due to rotation, firmly lock together the mathematical and physical aspects of geography. Physical geography finally shows us the spinning, tilted globe, throbbing with the innumerable activities which solar and telluric energy impart to terrestrial matter; sea and air beating upon the land and fashioning its scenery, while the mathematical bounds of climate are almost neutralised by rearrangements due to the interchange of tropical heat and polar cold. Throughout these actions the immense control exercised by land-forms is to be traced in the disturbances of the movements of air and water from the order which would prevail if a smooth ocean or an uncrumpled land-surface covered the whole Earth.

The carving of the crests of the land has yielded soft soil which swathes the lower slopes in flowing sheets warmed by the Sun and moistened by the shower; but bare soil or vacant sea or air do not meet the eye over the greater part of the globe's surface. Living things possess the world, and the purpose of *Biogeography* is to trace out the reasons why particular species occupy the regions where they are now found. The result shows that those conditions which form the subject of physical geography are the main controlling elements in the distribution of plants and animals. The regions of forest, steppe and desert are fixed by the form and position of the continents and by the climate, which in most cases is also largely dependent on the same control. Geography so far takes account of the greater part of one aspect of evolution, from the development of the solar system itself, following down the cooling Earth with its crumpling crust until the surface is covered with the products of life. Some geographers even bring in the layer of living matter to complete four parts of the physical globe—the lithosphere, hydrosphere, atmosphere and biosphere.

Amongst all the species of animals which dwell upon the land subject to the severe control of geographical environment one rises so far superior to the rest as to require a special division of geography to take account of its distribution. This is the human species. Alone amongst the animals man, in virtue of his higher intelligence, has the power, while always under the control of his surroundings, to react upon his environment in such a way as to render its action more beneficial to himself. By cultivation and breeding he alters the character and the distribution of plants and animals, by works of draining and irrigation he modifies the natural watering of the land, by cutting canals and building dykes he changes the relative positions of land and sea, even to the severance of continents. Engineering works enable him to overcome the resistance to free movement presented by vast stretches of waste land, great rivers, mountains, and the ocean

itself. The object of *Anthropogeography* is to study the distribution of the varieties of mankind, their degree of culture, and the manner of their groupings and movements. It is obvious that the whole of the other aspects of geography are tributary to this, and the greatness of anthropogeography and its practical importance make it necessary to subdivide it, the subdivisions being farther advances in evolution.

The distribution of man as an animal is merely one of the problems of biogeography ; the consideration of human activity on the Earth's surface is the main purpose of anthropogeography ; but when divisions of mankind acquire a higher civilisation and a firmer hold on definite regions of the Earth's surface, occupying them to the exclusion of other tribes, and, it may be, extending the territory by annexing that of neighbours, *Political Geography* acquires importance. It takes account of boundaries of settlements, sites of towns and ports, and the lines of travel or migration. Up to this point geography may be studied as a purely physical science, but here history has to be appealed to in order to understand how boundaries came to occupy their present position, and how the people possessing a country have entered or been formed in it in the past. Many other considerations also have weight ; strategic value, for example, converts into determining factors many features which are of no particular significance physically.

While the motives for distant travel have often been political—the outcome of military ambition—and often religious, at the prompting of missionary zeal, the chief cause which drives people to distant lands and guides migrations and colonisation is personal advantage. This may either take the wide form of economic necessity, due to the failure of supplies in the original home, or the more individual form of trading. *Commercial Geography* has to do mainly with the discovery, production, transport and exchange of useful and desirable things. In order to understand it the fashions and fancies of the various sections of the human race (*e.g.*, the purely fanciful value set upon the diamond) have to be considered, as well as the influence of historical tradition and of the laws of geographical distribution.

Geographical Changeableness. — From each successive point of view the phenomena to be taken account of in geography have become successively more complicated, more changeable and less predictable. The rigid degree-net of the mathematical geographer with its definite and unchangeable frigid, temperate and torrid zones, was represented as accurately five hundred years ago as now, and no change in it can ever occur. The data of physical geography are harder to discover, more laborious to acquire, and to some extent liable to change. We cannot as yet produce a perfect topographical map of the continents, nor a passable hypsographical map to show their elevations, nor anything more than a foreshadowing of a geological map of the world. Within historic times new islands have appeared, stretches of coast have been submerged,

shores built up into land, and old mountains have been shattered into dust by volcanic explosions. The natural divisions which separate distinct faunas and floras are still questions of dispute; no two biological maps are alike, and even if the distribution of species could be accurately charted to-day they would be antiquated to-morrow by natural changes. This tendency to grow out of date is still more marked in political maps. The frontiers of countries waver in the field of history; maps of Europe which were perfect in 1800 became nearly useless in 1815; and those justly viewed as excellent in 1870 had to be superseded in 1878. No map of South America can be coloured into countries in a manner acceptable in any two of its contiguous States. But all these aspects of geography are relatively permanent compared to the commercial as shown by the producing areas, markets and lines of transport and communication which appear in a commercial atlas. The customs barriers, more impenetrable in their way than any of nature, are continually shifting in position and varying in severity, old mines become exhausted and new ones are discovered, old lands pass out of cultivation, and new lands spring into importance through irrigation, even taste and fashion change, and with them the collecting grounds of the materials for their gratification.

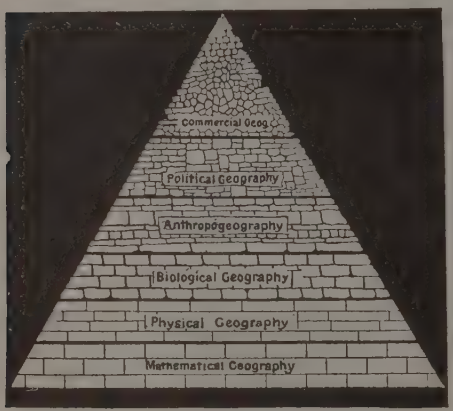

FIG. 2.—*The Departments of Geography.*

The Pyramid of Geography.—To summarise at a glance this scheme of the aspects and objects of geographical science we may consider them as forming a pyramid (Fig. 2), broad-based on the smooth hewn blocks of mathematics, rising through tiers of firmly laid stones from the quarries of the physical sciences, and the less sure products of biology and anthropology to the irregular courses of political geography and the rubble heap of commercial geography which caps if it does not crown the edifice. Here an extension of the metaphor may be permitted. The incoherent and shifting cap of the pyramid is not without its influence on the rest. As rain filtering through a great piece of masonry dissolves the mortar of the upper parts and redeposits it lower down, so the streams of economic interests have spread downwards through the whole structure of the geographical pyramid binding it together. Commercial motives consoli-

date national life, accentuate racial differences, redistribute animals and plants, modify physical conditions, start investigations into the nature of the Earth, and even invade the solid ground-work of mathematics with practical suggestions.

The Practical Value of Geography.—It may be that some readers are repelled rather than attracted by the foregoing attempt to explain the nature and contents of geographical science. If this be so it would be well to read carefully the description of some one country, and endeavour to trace out the part each separate aspect of geography plays in accounting for the character of the land, and the relation of its people to it. It is often supposed that while geography is very useful to the sailor, the soldier, the missionary, and the traveller, who have to go from place to place, or to the merchant who has trading interests in distant lands, it has little concern with the life of the stay-at-home citizen. This is quite a mistake. Many of the interests of the present day are largely geographical, and the daily paper acquires a fresh and fuller interest when it is read in this light. Even to know where the places one reads of are, what is their climate, and how they are peopled, is something; but, taking the wider view of geography as the science which aims at explaining the adjustment of people to land, there is scarcely a problem of past history or of present politics and economics in any country which cannot be elucidated by the application of its principles. When it is once realized that geography is not merely a description of the immobile surface of the Earth, but a comprehensive study of the influence which the land exercises on its people, and of the reaction of the people on their own and on other lands, the value of the science and its practical utility will reveal themselves in many ways. Some may perhaps consider that geography is made to include too much, that it is made the centre and the circumference of human knowledge; but this is simply an effect of perspective. Geography is not claimed to include the sciences whose results form its raw materials, any more than a house can be said to include the quarries, the forests and the mines which have yielded its stone and timber and metal-work.

The Course of Geographical Discovery.—The history of every branch of inquiry is full of value, and in the following articles there are many paragraphs dealing with the past events which have led to present conditions. There is not space here to allow of any attempt to give even an outline of the history of geographical discovery or geographical theories; but a few of the greatest landmarks must be recalled. The most ancient civilisations were those of the great nations which grew up on the plains of the Euphrates, the Nile, the Ganges, and the rivers of China. Each of these formed a centre whence the surrounding lands were explored to a certain extent and the results placed on record. The records, however, did not affect the farther progress of discovery. The *Mediterranean* or Græco-Roman civilisation was the centre whence grew, like spreading water-rings round the spot where a stone has fallen, th

wave of exploration which has revealed the world, and rendered possible the *Oceanic* or world-wide civilisation of the present.

Geography among the Greeks.—That the early Greeks viewed the world as a flat disc of land is revealed in Homeric poetry, and in the descriptions of the earliest maps like that of Hecatæus in B.C. 500 (F.g. 3). The Mediterranean Sea penetrating this land divided it into two parts—Asia and Europe. Round the circumference of the whole, at an unknown distance, ran the great Ocean River which connected all the seas. Herodotus recognised the Red Sea as separating the ancient "Asia" into two parts, Asia and Africa, and thus the three continents of the Old World were known and named before 430 B.C.

FIG. 3.—*The World according to Hecatæus.*

The coast of the Mediterranean was fully explored at a very early date, and colonies of Greeks established at favourable points. About 330 B.C. Pytheas, a Greek colonist of Marseilles, sailed out into the ocean, and explored its shore northward, discovering the British Islands. About the same time the armies of Alexander the Great extended the knowledge of the Greeks eastward as far as India; and the spherical form of the Earth, early suspected by Greek philosophers, was for the first time clearly proved by Aristotle. The attempt to fit the *œcumene* or known world to the sphere revealed the immensity of the unknown surface of the Earth, and gave opportunity for speculations as to the existence of inhabitants beyond the zone of killing heat to the south and near the region of fatal cold and darkness to the north (Fig. 4). It was easier from the development of mathematical astronomy to estimate the size of the globe than to measure the extent of the known lands, for although distances north and south were early found by astronomical observations, distances east and west could only be guessed at by estimates of the length of marches. Hence it happened that when Ptolemy of

FIG. 4.—*The World according to Pomponius Mela*, A.D. 47.

Alexandria produced his great work on geography in A.D. 150, he believed that the known land extended from west to east half way round the globe, *i. e.*, for 180° instead of 130°, as is the case. As he also adopted 21,000 miles as the value of the equatorial circumference of the Earth instead of nearly 25,000, he made out that the east coast of Asia was only about 9,000 miles west of the west coast of Europe. As he estimated the extent of the known land from north to south at only 80°, it was natural for him to use a word corresponding to *breadth* for this direction, and one corresponding to *length* for extension from west to east, and thus our words *latitude* and *longitude* had their origin. The most curious feature on Ptolemy's map (Fig. 5) is the great eastward extension of South Africa, which he believed to enclose the Indian Ocean on the south; this belief in a closed ocean did much to discourage attempts to reach India from Europe by sea. Ptolemy's work marked the culmination of ancient geography, and after it appeared no further advance was made for more than twelve centuries.

FIG. 5.—*The Known World according to Ptolemy*, A.D. 150.

Geography in the Middle Ages.—From the fall of the Roman Empire onwards geography shared in the general neglect of all natural science. The theory of the sphericity of the Earth was supposed to be in conflict with Scripture, and was consequently abandoned by the Christian monks who were the only upholders of any form of learning in Europe during the Middle Ages. They made a few fantastic guesses to account for such natural phenomena as they could not overlook; but they did some service to geography by recording the travels of many zealous missionaries, who penetrated to all parts of Europe and made some daring journeys through Asia. These records, however, were for the most part rendered ridiculous by the stories of mythical wonders which were accepted greedily in a credulous age. The great journey of Marco Polo (1271–1295) across Asia and through the eastern archipelagoes was made possible by the conquests of the Mongol emperor Jenghiz Khan, whose power, though a menace to Christian Europe, was a guarantee of peace and security throughout the vast breadth of Asia. The one class in Europe who utilised correct geographical methods at this period was the seafaring population of the Mediterranean, whose compass-charts of that sea were remarkably accurate. The Arabs, however, had kept up the knowledge of Ptolemy's work, which they had translated from the Greek;

Arab geographers throughout the Middle Ages were familiar with the spherical form of the Earth, and their travellers added much to the knowledge of the interior of Africa. The power of this cultured people was broken by the crusading armies and by the incursions of the barbarous Turks who, sweeping across Asia Minor, threw themselves into Europe, and capturing Constantinople in 1453 scattered all over Christendom the learned men who had preserved there the Greek language and literature. From this time onwards Ptolemy's work, which was translated into Latin and printed in 1462, was accepted as the standard in all matters of geography, until the great explorations of the succeeding period made fresh works necessary.

The Era of Voyages of Discovery.—The desire to find a sea-route from the Mediterranean to the spice-yielding lands of the East was greatly strengthened in the first quarter of the fifteenth century by the hampering of the overland Eastern trade by the Turks. About 1418 Prince Henry of Portugal, subsequently surnamed the Navigator, devoted himself to the encouragement of exploration along the coast of Africa with the object of seeing whether there might not be a passage into the Indian Ocean on the south. This work was continued after his death in 1460, until Bartholomew Diaz, in 1486, rounded the Cape of Good Hope. About this time maps were constructed in which the exaggerated breadth of Asia assigned by Ptolemy was increased from the interpretation of Marco Polo's routes, so that Japan was made to appear only 8,000 miles west of Portugal. From the study of these maps Christopher Columbus was convinced that Asia could most easily be reached by sailing west. In 1492, after years of effort, he succeeded in getting ships from Spain, and in little more than two months' voyage he discovered new islands which he named the West Indies because he believed them to lie off the coast of Asia. The excitement created in Europe on his return was immense, and at once inaugurated a period of the most daring sea-voyages known to history. It was followed by the re-discovery of North America by Cabot, the gradual feeling out of the great continent of the New World which barred all prospect of sailing directly west, and by the first sea-voyage to India by Vasco da Gama in 1498, following up the Eastern route so long advocated by Prince Henry. The keenness of the rivalry of Portugal on the eastward passage and Spain on the westward led to the rapid exploration of the new coasts and an almost desperate search for some way round America by the north or by the south. This culminated in the most splendid feat of human daring at sea, the voyage of Magellan through his strait and across the Pacific in 1520. The return of his expedition by the Cape of Good Hope, after finding the western route to the Spice Islands, placed the true form of the Earth beyond doubt for ever, even to the least imaginative; and so closed the brilliant quarter century which had pushed the Mediterranean, from all antiquity the centre of the world, to one side, off the main tracks of trade.

Later Explorations.—Throughout the sixteenth and seventeenth centuries the merchant adventurers of northern Europe reaped the full advantage of their newly discovered position in the centre of the oceanic world, and planted their colonies and trading posts almost on every shore. Australia was discovered, though its importance was not recognised. The efforts to find a north-west and north-east passage to India were continued valiantly, but they failed to do more than open up new fishing grounds. While travellers brought back reports of their discoveries, the geographers and cartographers of Europe were engaged in producing annotated editions of Ptolemy and new text-books and atlases setting forth the new facts. Amongst them were the great cartographers of Flanders and the Netherlands—Mercator, Ortelius, and Blaeu, and such authors as Waldseemüller (who in 1507 first proposed the name *America*), Munster, whose *Cosmographia* of 1544 is a curious blending of old legend with new fact, and Varenius, who first gave expression to modern theories. Athanasius Kircher, though given to fantastic speculations, greatly promoted the study of physical geography in the seventeenth century.

The Eighteenth Century.—Notable advances in the art of navigation, especially the invention of the sextant and the perfection of the chronometer, enabled the positions of distant places to be fixed for the first time with accuracy, and detailed surveys of coasts and countries were set on foot. Arcs of the meridian were measured with a high degree of precision, and the true dimensions of the Earth became known. Much of the interior of North America was explored, and the coasts of the Pacific charted for the first time. Captain James Cook stands out pre-eminent amongst the numerous bold maritime explorers of the century, for he combined for the first time scientific method, nautical skill and indomitable enterprise. In his first great voyage of circumnavigation (1768–71) he surveyed the coasts of New Zealand and the east of Australia. In his second (1772–75) he circumnavigated the world close to the Antarctic Circle and put a stop to the agreeable illusion that a vast temperate southern continent existed. In his third voyage (1776–79) he surveyed much of the west coast of North America, and discovered the Sandwich Islands where his splendid career came to an untimely end. The French geographer, D'Anville, is memorable not so much because he filled the maps of the period with fresh details, but because he subjected all the data from which maps had previously been compiled to the most rigorous criticism, and rejected everything which was conjectural, or could not be verified.

The Nineteenth Century and After.—The advances made during the nineteenth century were so great that this volume is largely a summary of the results then attained. Africa and Australia were completely explored, parts of Asia were traversed for the first time since Marco Polo passed that way; the area of the unknown polar regions was much reduced; the whole of America roughly surveyed, and practically all Europe mapped with high accuracy. Geological sur-

veys have followed the topographical in all civilised and in many undeveloped countries, and the distribution of plants and animals has been widely and systematically studied. The cruise of H.M.S. *Challenger* (1872–76) was by far the greatest voyage of purely scientific investigation ever attempted, and it has thrown a flood of light on the conditions of the oceans and of oceanic islands. Although separated by almost a hundred years A. von Humboldt, who explored Central and South America and parts of Asia, and Fridtjof Nansen, who approached nearer the North Pole than any man before him, may be taken as representative types of the scientific travellers of the nineteenth century. Of naturalist travellers A. Russel Wallace may be specially named. In the great army of missionary explorers David Livingstone stands pre-eminent; and amongst those actuated by other aims, no name approaches that of H. M. Stanley. The modern developments of cartography are best illustrated in the work of Stieler, Arrowsmith, Petermann, A. Keith Johnston, and J. G. Bartholomew; and large modern text-books by the great works of Malte-Brun commenced in the first decade, and of Elisée Reclus completed in the last decade of the nineteenth century. The leaders in the science whose work has been most fruitful in guiding the researches and forming the opinions of recent geographers were Humboldt, Ritter, and Peschel, to whose influence the remarkable development of higher geographical learning in Germany may be directly traced. But Charles Darwin, not so much by his researches in physical geography, though they are important, as by his services in establishing and making familiar the theory of evolution, has done more than any geographer of the nineteenth century to advance the science by popularising the co-ordinating clue which unifies it.

The Progress of Geography.—While progress in most sciences in all countries has been largely due to the work of University professors whose duty it is to study and to teach it, geography has, until very recently, been served rather by the voluntary association of persons interested, who have formed geographical societies in all parts of the world. The first was founded at Paris in 1821, the second at Berlin in 1828, and the third, which is now the most influential, at London in 1830. The largest is the National Geographic Society at Washington which had 30,000 members in 1908. There were in 1901 no less than 89 active geographical societies in Europe with more than 60,000 members, 6 in Asia, 8 in North America, 5 in South America, 3 in Africa and 4 in Australia; 115 altogether. There are also more than 150 different geographical journals or magazines published regularly in all parts of the world. It may safely be said that this argues a more wide-spread interest in geography than exists in any other science; and the reason for that interest is that geography is of practical every-day utility to the average citizen of the world.

The accompanying map (Fig. 6) shows graphically how far the foundations of geography have been laid by exact surveys, and how in the polar regions, in the heart of Asia, Africa and South America there still remain somewhat extensive areas concerning which we are absolutely ignorant.

But these will be filled up before long, and the threat has been heard that then the geographer will have no more work to do. This is, however, a mistake. The geographer will only then be able to begin his real work. He will have to secure geological, biological and anthropological surveys of equal quality, and then at last all the data will be complete to his hands

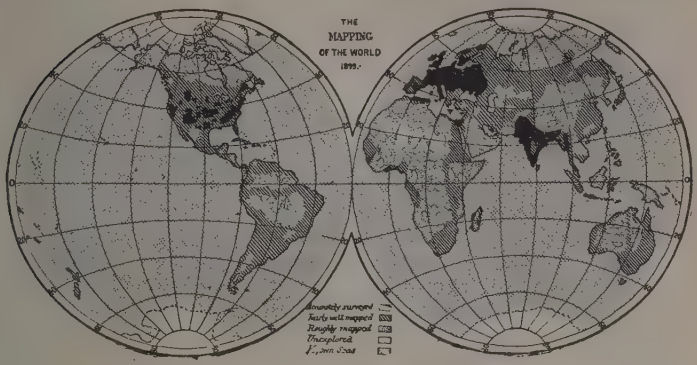

FIG. 6.—*The Value of the Maps of the World.*

for perfecting the theory which explains the relation of man to his terrestrial home.

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CHAPTER II.—MATHEMATICAL GEOGRAPHY

By A. M. W. Downing, D.Sc., F.R.S.,
Superintendent of the "Nautical Almanac."

Mathematical Geography deals with the form and dimensions of the Earth, and the methods employed for determining and representing the positions of places upon its surface. In this chapter we shall also have occasion to refer to the Seasons and Tides as phenomena arising from the influence of the Sun and Moon upon the Earth, which are of the utmost importance in the economy of the latter considered as a habitable planet.

The general idea of the rotundity of the Earth is one that has long been familiar, and may readily be inferred from a variety of easily observable phenomena. Probably the most convincing of these is the observation that the outline of the shadow of the Earth, as seen upon the disc of the Moon during a lunar eclipse, is that which only a spherical body could produce. The Earth, therefore, we may conclude is spherical, or nearly spherical, in form, and (as it can be circumnavigated) is limited in extent.

To determine accurately the form and dimensions of the Earth—by which we mean those of the surface of the ocean as they would be if the ocean covered the entire Earth—recourse must be had to measurements on the Earth's surface, in combination with observations of the stars. And it is to be noted that observations of the stars are valuable in this connection on account of their vast distances from the Earth. The Earth's diameter is found to be insignificant when compared with the distances of the stars, and the latter can, accordingly, be used as fixed marks of reference, possessing this important property—that lines proceeding from distant parts of the Earth's surface to the same star may be considered to be strictly parallel. But this is not so in the case of bodies comparatively near us, such as the Sun or Moon. It is necessary to apply corrections to the observed positions of these to reduce them to what they would have been had the observations been made at the centre of the Earth. This is called the correction for parallax.

Definitions of Terms.—At this point it will be convenient to introduce the definitions of certain terms, some of which will be frequently employed in the subsequent pages of this chapter. It is assumed that the reader is familiar with the ordinary phenomena due to the rotation of the Earth on its axis; how each of the heavenly bodies appears to rise in the east, to attain a certain maximum altitude depending on its position, and then to set in the west; how certain of the stars appear to observers in the northern or southern hemisphere never to rise or set, but to describe

circles round points in the heavens called respectively the north and south poles. And we assume that the reader is aware that these phenomena are due to the fact that the Earth rotates round an axis which is situated in the direction of the line joining the north and south poles of the heavens.

The *Poles* of the Earth are the points in which its axis meets the surface —north and south respectively.

The *Equator* is the circle described round the Earth at an equal distance from the poles, and dividing it into two hemispheres. The plane of this circle passes through the centre, and is at right angles to the axis.

The *Celestial Equator* is the circle marked out in the heavens by the extension of the plane of the terrestrial equator to meet the vault of the sky.

The *Zenith* is the point overhead of the observer where a plumb-line suspended at his station would pierce the sky if produced upwards ; the point opposite to the zenith (underfoot, of course) is called the *Nadir*.

The *Visible* or *Sensible Horizon* is the circle traced out by the extremities of a plane passing through any place on the Earth's surface, and perpendicular to the line joining the zenith and nadir of the place. The *Rational Horizon* is the circle traced out by the extremities of a plane passing through the Earth's centre, and parallel to the sensible horizon. It should be noted that, on the immensely distant surface of the celestial vault, the two traces referred to sensibly coalesce into one single circle, which will hereafter be called the *horizon*.

Vertical Circles are great circles of the celestial sphere (*i.e.*, circles whose planes pass through the centre of the sphere) drawn through the zenith and nadir, and perpendicular to the horizon.

The *Altitude* of an object is measured on the vertical circle passing through it, and is its angular distance from the point of intersection of the vertical circle with the horizon.

The *Zenith Distance* is measured on the same circle, but from the zenith instead of from the horizon. It is, therefore, the complement of the altitude.

The *Azimuth* of an object is the angular distance of the point of intersection of the vertical circle passing through it with the horizon, measured from the north or south point of the horizon.

Hour-Circles are great circles passing through the poles of the celestial sphere, and therefore perpendicular to the celestial equator.

The *Meridian* is the great circle passing through the zenith and the poles ; the terrestrial meridian being the trace of the plane of this circle on the Earth's surface. The meridian intersects the horizon at the north and south points of the latter. The meridian marks the point of greatest altitude in the apparent diurnal path of each star, due to the Earth's rotation.

The *Hour-Angle* of a celestial object is the angle at the pole between the meridian and the hour-circle passing through the object. It evidently is zero when the object is on the meridian.

The *Latitude* of a place on the Earth's surface is the angle between its plumb-line and the plane of the equator. If the Earth were a perfect

sphere, the direction of the plumb-line at any place on the Earth's surface would coincide with the direction of the line drawn from the point to the centre. But, as we shall see presently, the figure of the Earth deviates slightly from that of a sphere, and geographical latitude must be referred to the direction of gravity, not to that of the Earth's radius, at the place. Latitude is measured from 0° at the equator up to 90°, north or south, at either pole.

The *Longitude* of a place on the Earth's surface is the angle at the pole between the initial meridian (that of Greenwich, for instance) and the meridian passing through the place. It is measured from 0°, at the initial meridian, up to 180°, east or west.

Determination of Latitude.—The fundamental proposition with regard to latitudes on the Earth's surface (which is assumed in every method used for determining latitudes) is that the latitude of a place equals the altitude of the celestial pole.

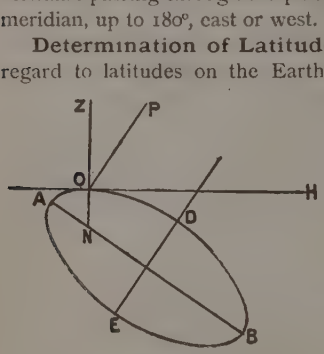

FIG. 7.

This will be clear from Fig. 7, in which ADBE represents the terrestrial meridian of the place (its ellipticity enormously exaggerated), AB the equatorial, and DE the polar diameter of the Earth, O the position of the observer, Z his zenith, and OH the horizontal plane. Through O draw OP parallel to DE, which is the direction of the celestial pole. The altitude of the pole is POH, and the latitude of O is ZNA, from the definition given above. But these angles are equal, as OP is perpendicular to AB, and ZN is perpendicular to OH.

To determine the latitude of a place it is, therefore, only necessary to find the altitude of the celestial pole at that place. The most obvious way of doing this is to select a circumpolar star, *i.e.*, a star which appears to describe a circle round the pole without ever setting below the horizon. The altitude of this star should be measured at its upper meridian passage, and again at its lower meridian passage (between the pole and the horizon), and the half sum of these altitudes, when corrected for refraction, will be the altitude of the pole.

The latitude can also be determined by observing the meridian altitude of a celestial body whose position is known. Let HZN (Fig. 8) be the meridian, Z the zenith, P the pole, S the known body passing the meridian, and HN the horizon. As the position of the body is known, the angular distance from the pole, PS, is known, and the angular distance HS is the observed altitude. Therefore PH is known, which, taken from 180°, gives PN the altitude of the pole, or the latitude.

The latitude at sea, or in an unsettled country, is generally found by observing, with a sextant, the Sun's maximum altitude, which of course

occurs at noon. The sun is watched for some time before reputed noon, until it is observed that his altitude has ceased to increase. The maximum value is then recorded, which, when the proper corrections are applied, gives the latitude in accordance with the foregoing method.

Determination of Longitude. — The difference of longitude between any two places on the Earth's surface is simply the difference of local times at the two places at the same instant of absolute time. The determination of the longitude of any place, therefore, involves the two operations of finding the local time, and comparing it with the corresponding time of the initial meridian.

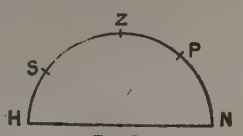

FIG. 8.

Time is measured by the rotation of the Earth on its axis. The interval between two successive passages over the same meridian of a star is called a sidereal day, and of the Sun a solar day. Owing to the fact that the motion of the Earth in its orbit round the Sun is unequal at different times of the year, the solar day, as above defined, is not of constant length. At one time of the year a longer interval elapses between successive passages of the Sun over a meridian than at another. On this account the actual solar day is unsuitable as a measure of time for practical purposes. In its place we use the average solar day as a standard of measurement, and time thus measured by a mean Sun is called mean solar time. It is to this time that our clocks are regulated. The time shown by a sun-dial is true, or, as it is called, apparent solar time. The difference between mean and apparent solar time is called the equation of time. When the Sun's centre is exactly on the meridian of any place it is, of course, apparent noon at all places situated on that meridian. The equation of time being applied, we have, then, the instant of mean noon at all these places. Now in twenty-four mean solar hours the mean Sun passes over every meridian in succession, or over 360°, so that in one hour he moves from one meridian to another which is 15° to the west of it ; and so on at the same rate throughout the twenty-four hours. It is this consideration that enables us to convert differences of local times into differences of longitude. A little consideration will show that when it is noon on the initial meridian (that of Greenwich, for instance) it is earlier for places to the west of Greenwich by the amount of one hour for each 15° of west longitude ; and similarly it is later for all places to the east of Greenwich.

The first requisite, then, for the determination of the longitude of a place is to find the local time. This may be effected by observing when the Sun or a known star passes the meridian. But the navigator or traveller generally determines time by observing, with a sextant, the altitude of the Sun when at a distance from the meridian. This method assumes that the latitude of the place is known. In the triangle PZS (Fig. 9) where P is the pole, Z the zenith, and S the Sun, the side PZ, being

the complement of the latitude, is known, also PS, the distance of the Sun from the pole is known, and ZS, the zenith distance, is the complement of the observed altitude. From these data the hour-angle ZPS is found, and hence the interval from noon, and finally the mean time. The difficulty in the determination of longitude consists in finding the corresponding time on the initial meridian. The most obvious way of doing this is to carry a chronometer, which indicates it; and this is the practice resorted to on board ship. If chronometers could be constructed which would maintain their rate for an indefinite time, notwithstanding changes of temperature or other disturbing causes, there would be no further difficulty. But this is still far from being the case, and other expedients have to be resorted to either where greater accuracy than can be obtained by relying on a chronometer is desired, or where, from any circumstance, it is found impossible to employ this method. The most accurate method, and that which has superseded all others where its use is practicable, is the transmission of time-signals by telegraph. The local time, as determined on any meridian, is telegraphed to the station on the initial meridian, which in turn sends its local time to the first station, and thus the difference of local times at the two stations is recorded at each station. Where the telegraph is not available, recourse must be had to the observation of some astronomical phenomenon, the time of the occurrence of which on the initial meridian is known, or may be ascertained. Of these we may mention the measurement of the distances of the Moon from certain bright stars, technically called the lunar-distance method, and the observation of the times of disappearance or of reappearance of stars at their occultation by the Moon, a method which is susceptible of great accuracy in the hands of skilful observers.

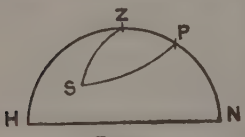

FIG. 9.

It may be noted that all the mathematical and astronomical data of use to navigators and travellers are published annually in the *Nautical Almanac*, compiled for the British Government, and similar publications issued by other nations. The necessary calculations are made so far in advance as to allow these ephemerides to be published two or three years ahead of the year to which they refer.

It is evident that the exact position of a place on the Earth's surface is known when its longitude and latitude are known. The longitude tells us on what meridian the place is situated; the latitude, its angular distance from the equator measured on that meridian. These two quantities are called the *co-ordinates* of the place. With the third co-ordinate, *i.e.*, the altitude of the place above the mean sea-level, we need not concern ourselves here. Two co-ordinates are always sufficient to fix the position of a point on a suface.

Form and Magnitude of the Earth.—Having the means of

determining the latitudes and longitudes of places on the Earth's surface, we are in a position to ascertain its exact form and dimensions. In order to effect this, it is necessary to measure the exact number of feet or miles between points, in different parts of the Earth, which differ in longitude or latitude by an ascertained number of degrees. The methods employed to effect the accurate measurement of great distances on the Earth's surface by means of a trigonometrical survey form an essential part of geodesy, into the details of which we cannot enter. Suffice it to say that by means of an elaborate system of measurements, such as are referred to above, the general shape of the terrestrial meridians has been ascertained to be that of an ellipse ; and the general figure of the Earth to be that which would be produced by the revolution of an ellipse round its shorter axis, or a *spheroid of revolution*, as it is technically called.

The semi-axes of these meridianal ellipses, or the equatorial and polar radii of the Earth, are 20,926,202 feet and 20,854,895 feet respectively, and the ratio of their difference to the equatorial radius, or the ellipticity of a meridian, is $\frac{1}{293\cdot4663}$. The uncertainty attaching to these values of the Earth's radii may be taken to be about 235 feet in excess or defect. The length of a degree of latitude and of a degree of longitude in any latitude ϕ may be found in feet from the formulæ :—

$$1^\circ \text{ of Latitude} = 364{,}609\cdot12 - 1{,}866\cdot72 \cos 2\phi + 3\cdot98 \cos 4\phi$$
$$1^\circ \text{ of Longitude} = 365{,}542\cdot52 \cos \phi - 311\cdot80 \cos 3\phi + 0\cdot40 \cos 5\phi.$$

A table giving the lengths for every 5° of latitude, computed from these formulæ, will be found at the end of the chapter. It should be noted that some of the measurements that have been made appear to indicate that the equator of the Earth is not a true circle (as is assumed above), but an ellipse differing slightly from a circle, the difference between the semi-axes being about 1,500 feet. In the present state of our knowledge, however, it is better to assume a regular spheroid for the standard surface of the Earth, and to regard all variations from it as local or accidental phenomena.

There are two other methods of ascertaining the form of the Earth which are quite independent of that referred to above, and of each other, which may be mentioned. One is from observations of the variation of the force of gravity at different places on the Earth's surface ; the other is from observations of the Moon, some of the irregularities in whose motions are due to the deviation of the figure of the Earth from a sphere. The results of these methods are fairly in accordance with the more direct measurements.

The flattening at the poles of the Earth is a necessary consequence of its rotation, and may be mentioned as affording evidence of it.

The Use of the Globes.—In order to utilise fully our knowledge of the form and dimensions of the Earth, it is necessary that we should be able to represent the whole, or portions of it, on a convenient scale, to which refer-

ence may be made as occasion may require. Representations of the Earth in the form of a globe, or of maps, must now, therefore, occupy our attention. The terrestrial globe is obviously the most simple, and in some ways the most accurate, form of representation. When constructed of an easily manageable size, it is not possible to represent the Earth as other than a perfect sphere, the difference between the equatorial and polar radii, which amounts to 13½ miles, being too small a quantity to be shown on an ordinary globe. For the same reason the spherical surface is represented as everywhere perfectly smooth; even the highest mountains being insignificant on the scale we are considering. It is important, however, to notice that it is only on a spherical surface that the different countries, seas, &c., of the Earth can be represented in their proper proportions throughout the whole extent of the surface. And that when represented on a plane surface, as in maps, there must necessarily be distortion of some of the parts. In this respect the globe has an immense superiority over the map.

It is assumed that the reader is familiar with the properties and ordinary uses of a terrestrial globe; that he knows, for instance, that the circles of latitude are all parallel to the equator (hence called parallels of latitude), and are all, except the equator itself, small circles of the sphere. Also that the meridians all pass through the pole, and are all equal great circles; that the degrees of latitude are equal to each other throughout, and that a degree of longitude in latitude ϕ equals the equatorial degree multiplied by Cos ϕ. The globe, as ordinarily used, affords a rough and ready method of solving problems, the accurate solution of which requires a knowledge of spherical trigonometry.

Map Projections.—The globe is not, for most practical purposes, a suitable instrument for the representation of the Earth's surface. For this purpose maps are usually employed, when portions of the surface are required to be represented in a more convenient form. A map is nothing more than a representation, upon a plane, of some portion of the surface of a sphere. But as it is impossible to make a spherical surface coincide exactly with a flat surface, no map can represent the different portions of the Earth in their true magnitudes and true relative positions. In the construction of maps, therefore, various methods of projection (as it is termed) are adopted, so as to give results that may be most suitable for the particular ends in view. Some of the methods are perspective representations of the Earth as it would appear to an eye placed in certain positions with regard to its surface. These are chiefly employed in the representation of hemispheres. Other methods are developments of parts of the Earth's surface, and are only suitable for the accurate representation of restricted portions. We proceed to describe a few of the more important projections, premising that, in what follows, we neglect the ellipticity of the Earth.

Perspective Projections.—The perspective representation of an object will be different according to the position which the eye occupies

with regard to the object, and to the plane of projection, or surface on which the representation is made. In projecting hemispheres the eye is supposed to be placed vertically above or below the plane of projection, which is always that of a great circle of the sphere. The position of the eye determines the character of the projection. Those most commonly employed are the Orthographic, the Stereographic, and the Equidistant.

FIG. 10.

In the *Orthographic projection* the eye is supposed to be placed at an infinite distance, so that all lines drawn from it to the object may be considered parallel. Every point of the hemisphere is, therefore, referred to the plane of projection by a perpendicular let fall on it, and in this way a representation of the hemisphere is mapped on its base. It is obvious, from Fig. 10, that only the central portions are truly represented in this projection, whilst the outlying portions are greatly distorted and diminished in size.

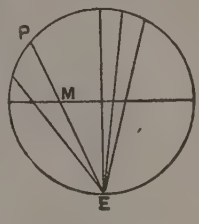

FIG. 11.

In the *Stereographic projection* the eye is supposed to be placed on the surface of the sphere at E (Fig. 11), and to view the concave surface of the opposite hemisphere, every point of which, as P, is referred to the plane of projection by the line PME. In this projection the similarity of portions of the spherical surface is better preserved than in the preceding one. The projected dimensions are, however, distorted in a contrary manner, being unduly enlarged in receding from the centre.

As when the eye is supposed to be placed at an infinite distance the outlying portions of the map are unduly diminished, and when the eye is supposed to be on the surface of the globe the outlying portions are unduly enlarged, there will be some intermediate position of the eye where one of these distortions will counteract the other. This is the principle of the *Equidistant projection*, or the *Globular projection*, as it is sometimes called. In this the eye is supposed to be at E (Fig. 12) on the diameter of the sphere perpendicular to the plane of projection, and at a distance from the surface EB = radius $\times \frac{1}{\sqrt{2}}$. If then P be the middle point of the quadrant AD, it is referred to the plane of projection by the line PME, and, by the principles of elementary geometry, OM = MD. And we shall find that other equal arcs on the hemisphere are projected into nearly equal lines. In the equidistant projection the relative dimensions of the objects delineated are therefore much better preserved than in those previously described. It does not,

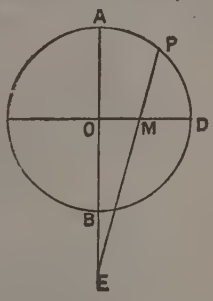

FIG. 12.

however, exhibit figures similar to those on the sphere, and in this important particular is inferior to the stereographic projection. Its special value is for the representation of distributions in which it is desired to compare areas by measurement.

Conical Projections.—It is a well-known property of a cone that its curved surface can be spread out, or developed on a plane, without any alteration in the figure and dimensions of its parts. This property is made use of in the *Conical projection*. A part of the Earth's surface lying between two parallels of latitude, not very distant from each other, ABCD (Fig. 13), will not differ much from part of the surface of a cone, OPQ, whose axis coincides with the polar axis of the sphere and which touches the sphere midway between the parallels. And if the latter surface be developed on a plane, the countries, &c., may be delineated in more exact proportions than in any of the perspective projections. The parallels of latitude will be represented on the surface of the cone by circles described with its apex (O) as centre, and passing through points on OP which are at distances from the points of contact P, equal to those which the parallels occupy on the sphere. The meridians will be straight lines (OP, OQ) drawn from the apex to the points in which the meridians on the sphere intersect the middle parallel of latitude. It is obvious that, in this projection, the dimensions are strictly preserved for the middle latitude only. On this account modifications of it are often employed to obviate the increase in the distances measured along the parallel above or below the middle latitude. One of these consists in the subs itution of curves for straight lines to represent meridians. In this modification the degrees of longitude are marked upon each parallel in their proper proportion, and curved lines are drawn through the corresponding points.

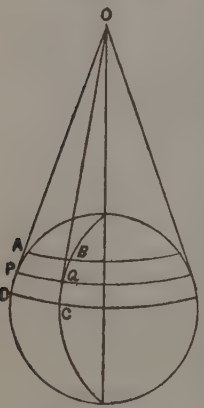

FIG. 13.

Another modification of the conical projection consists in regarding the cone not as touching the sphere, but as intersecting it; so as, for instance, to intersect it at two parallels equally distant from the middle latitude. This arrangement enables the geographer to embrace a considerably wider zone in latitude in his map, whilst preserving an extremely near approximation to exactness in his representation.

Mercator's Projection.—The last kind of projection to which we will refer is that known as *Mercator's projection*. In this projection a cylinder is supposed to circumscribe the sphere, touching it at the equator. The points on the sphere are referred to the cylinder by lines drawn from the centre. The cylinder is then unrolled into a plane. The equator is represented by a straight line, and the meridians by straight

lines at right angles to it, and all at equal distances from each other. The parallels of latitude are also straight lines. But as the degrees of longitude are, in this projection, made equal at all latitudes, in order to preserve the proper proportion, the degrees of latitude are increased on the map in the same ratio as the degrees of longitude are diminished on the sphere. This projection gives a true representation as to form, but varies greatly in the scale of different parts. The polar regions are, of course, enormously enlarged. Though not very suitable, therefore, for strictly geographical purposes, charts drawn on Mercator's projection are of the greatest importance for navigation, arising from the fact that the meridians and parallels are represented on them by straight lines. On this account the course of a ship from point to point will also be represented by a straight line; the rhumb line, or line intersecting the meridians at a constant angle, being, in this case, a straight line. In the other projections considered the rhumb line would be, in most cases, an inconvenient curve. The advantages of Mercator's projection, in laying down the course of a ship, are therefore sufficiently obvious, and, except for voyages in very high latitudes, charts constructed on this principle are always used for navigational purposes.

Great Circle Courses.—The navigator, as a rule, guides his vessel between any two places by sailing along a line which corresponds in direction with one of the points of the compass. It is obvious, however, that this course will not, in general, lie along a great circle of the sphere; in which case it will not be the shortest distance between the two points. It is sometimes found desirable, in practice, for a ship to adopt "great circle" sailing (as it is called) in preference to the more usual "Mercator" sailing. The direction and length of the arc of a great circle joining any two places are calculated by the rules of spherical trigonometry from their latitudes and difference of longitudes. And it is found that the economy in distance in great-circle sailing is greatest in high latitudes between places not differing much in latitude. Thus in sailing between Cape Horn and the Cape of Good Hope, a saving of 200 miles is effected by adopting the great-circle route.

Duration of Daylight.—The variations of the seasons depend on the inclination of the Earth's axis of rotation to the plane of her orbit, or the ecliptic. This inclination is about $66\frac{1}{2}°$, and the axis remains sensibly parallel to itself during the year. About March 20th the Earth is so situated that the plane of her equator passes through the Sun, and therefore the line separating the illuminated from the unilluminated portions of the Earth passes through the poles, or day and night are everywhere equal. The same thing happens on September 22nd, when the Earth reaches the opposite point of her orbit.

On June 21st the Earth is so situated that its north pole is inclined towards the Sun by $23\frac{1}{2}°$, so that that pole then receives sunlight throughout the twenty-four hours, as well as all the region lying within the Arctic

circle, *i.e.*, within a distance of $23\frac{1}{2}^{\circ}$ from the pole. And everywhere in the northern hemisphere the day is longer than the night, the difference in length depending on the latitude. At the same time in the southern hemisphere the days are shorter than the nights; whilst at the south pole, and over the region extending $23\frac{1}{2}^{\circ}$ around it, which lies within the Antarctic circle, it is continual night. It will be understood, then, that from March 20th to September 22nd the days in the northern hemisphere are longer than the nights, and it is summer for that hemisphere. During the same period, in the southern hemisphere, the nights are longer than the days, and it is winter there.

During the winter months of the northern hemisphere these conditions are, of course, reversed, whilst at the equator the day and night are of equal length at all times of the year.

These results are, however, somewhat modified when we take into account the effect of refraction in increasing the apparent altitude of the Sun, as is done in the table below. Thus in latitude 65° 55′, owing to the effect of refraction in increasing the apparent altitude, the Sun's centre appears just on the horizon at midnight at the summer solstice; whilst at the winter solstice, in this latitude, the Sun's centre is above the horizon for 2h. 38m. In latitude 67° 10′, owing to the same cause, the Sun's centre appears just on the horizon at noon at the winter solstice; whilst at the summer solstice, in this latitude, the Sun's centre is above the horizon for twenty-four hours. Between these limits of latitude, therefore, there is a twenty-four-hour day at midsummer, but not a twenty-four-hour night at midwinter.

Tides.—The Tides consist of the regular rise and fall of the water of the ocean, the average interval between successive corresponding high waters at any place being about 24h. 50m. But this is also the average interval between two successive passages of the Moon across the meridian. It is also observed that, at a given place, the time of high water occurs when the Moon has passed the meridian by a certain interval, and again when the Moon has passed the anti-meridian (or the meridian 180° distant) by the same interval. These phenomena at once suggest that there is a causal connection between the Moon and the tides.

The Sun produces a tide as well as the Moon, but much less in amount on account of its greater distance. The effect of the Sun's action is apparent at new and full Moon, when the tide-raising forces due to the two bodies act conjointly and produce the magnified effect known as spring-tides. Also when the Moon is in the first or third quarter the forces act against each other, thus producing the neap-tides, in which the ebb and flow are less than the average.

It is impossible within the limits of a short chapter, descriptive of the general features of mathematical geography, to discuss the theory of the tide-raising power of the Moon and Sun exercised by their differential attraction on opposite sides of the Earth. This must be sought for in special treatises.

TABLE GIVING THE LENGTHS IN BRITISH FEET OF 1° OF LATITUDE AND 1° OF LONGITUDE AT DIFFERENT LATITUDES, AND MAXIMUM AND MINIMUM NUMBER OF HOURS PER DAY DURING WHICH THE SUN'S CENTRE IS ABOVE THE HORIZON, ALLOWING FOR REFRACTION.

Latitude.	Length of 1° of Latitude.	Length of 1° of Longitude.	Above Horizon. Summer Solstice.	Winter Solstice.	Latitude.
°			H. M.	H. M.	°
0	362,746	365.231	12 6	12 6	0
5	362,774	363,851	12 22	11 48	5
10	362,858	359,719	12 38	11 30	10
15	362.995	352,866	12 58	11 12	15
20	363,180	343,342	13 18	10 52	20
25	363,408	331.213	13 38	10 32	25
30	363,674	316,569	14 0	10 10	30
35	363,968	299,515	14 28	9 44	35
40	364,281	280,177	14 58	9 16	40
45	364,605	258.698	15 32	8 42	45
50	364,930	235.236	16 18	8 0	50
55	365.245	209,967	17 16	7 4	55
60	365,540	183,083	18 44	5 44	60
65	365,808	154,787	21 46	3 24	65
70	366,040	125,293	24 0	0 0	70
75	366,228	94 830	24 0	0 0	75
80	366,366	63,632	24 0	0 0	80
85	366,451	31,940	24 0	0 0	85
90	366,480	0	24 0	0 0	90

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CHAPTER III.—MAPS AND MAP READING

By E. G. Ravenstein.

Maps and their History.—A map (from *mappa*, napkin) is a delineation on a plane of the whole or of a portion of the surface of the Earth. A collection of maps is called an Atlas, a term introduced by Mercator, who explains the meaning of the word he chose by a figure of the Titan of that name bearing a globe upon his shoulders.

Maps are of very ancient origin. The land surveyors of the civilised states of antiquity undoubtedly produced plans which met all practical requirements, whilst the needs of the navigator were served by Peripli and charts. At a very early age, too, these plans, combined with the information collected by travellers, were utilised in the production of maps of provinces and even of the whole of the habitable world. When Hecatæus (500 B.C.) warned his countrymen against engaging in a conflict with Darius he enforced his arguments by pointing out the vast extent of the Persian Empire upon a map of the "entire circuit of the world," which had been engraved upon a brazen tablet. (Fig. 3, p. 8.)

For the first maps with degree lines marked upon them we are probably indebted to Dicæarch of Messena (350–290 B.C.), who introduced the parallel of Rhodes as a diaphragm, or separator, between the northern and southern habitable worlds. But it was only after Eratosthenes (296–196 B.C.) had approximately determined the size of the Earth, and Hipparchus (190–120 B.C.) had taught map makers to lay down places according to their observed latitude and longitude, that scientific cartography can be said to have come into existence. Thales (600 B.C.) had already invented the gnomonic projection, Hipparchus introduced the stereographic and orthographic projections, but map makers like Marinus, the great predecessor of Ptolemy, seem to have been contented with producing plane charts, the meridian differences of which were correct only along the parallel of Rhodes, until Ptolemy (140 A.D.) published his famous map of the world on a conical projection. (Fig. 5, p. 9.) The principles laid down by Ptolemy for the compilation of maps apply in our time as they did in his, and to their development and the improvements of instruments and methods of observation modern maps are indebted for their comparative accuracy and scientific value.

The most valuable contribution of the Middle Ages to the progress of cartography consists of the so-called "Compass charts," specially designed for the use of mariners, and based solely upon compass bearings and an estimate of distances, without reference to any latitudes that may have been available from actual observation. The coast lines on these charts are given with remarkable fidelity.

Scale of Maps.—The *scale* of a map, or the proportion which it neally bears to the actual size of the region represented, is expressed ither in the form of a fraction whose numerator is 1, or by reference o some well-known unit of length. The former is the method more sually followed, and more to be recommended, as it is independent of the arious measures of length in use among different nations. Thus, when it stated that the scale of a map is 1–100,000th of nature, or 1 : 100,000, we now that every lineal unit on the map represents 100,000 such units in ature. Or it is stated that every inch, as measured on the map, represents ne or more miles in nature. Thus, a scale of 1 statute mile to the inch vhich is that of the British Ordnance Survey general map) is the same as scale of 1 : 63,360, for 63,360 inches are equal to one statute mile.

Measurement of Distances on Maps.—The scale to be found on early all maps is that of the equator or of the central meridian, and hence follows that this scale can be used for measuring distances only when ne area embraced within the map is small. In the case of maps of exten- ve regions or of continents, owing to the distortion or exaggeration nherent in all projections, its application would yield misleading results, uite apart from errors resulting from an expansion or shrinking of the aper in the process of printing. In proof of this we may refer to a emisphere laid down upon Lambert's equivalent projection, whose scale, s measured along the central meridian or equator, we suppose to be : 125,000,000. The scale of the same map, as determined by the meridian ncircling it, is 1 : 80,000,000, whilst a "mean" scale, equal to the square root f the proportion which the area of the map bears to the actual area on the lobe, would be 1 : 112,000,000. The only exception from this rule occurs in ne case of maps on an equidistant projection, but even in their case ap- roximately correct distances can only be obtained when measuring from ne centre towards the circumference.

In those few cases in which the distance to be measured follows the quator or a meridian, we may determine the interval in degrees and inutes, and thus obtain an approximate result in geographical miles, of hich sixty are equal to one degree of the equator. The result would, of ourse, be only an approximation, except under the equator, where minute=1 geographical mile[1] = 6,080·27 feet. The degrees, as measured ong a meridian, vary in length from 59·594 to 60·204 geographical miles. s a rule, the distance desired should be measured on a globe of suitable imensions, or calculated from trigonometrical formula to be found in very mathematical text-book. Where a globe is available, a scale should e drawn on a slip of paper, the edge of which is to be applied to the laces the distance between which it is proposed to measure.

The length of coast lines or of river courses should be measured on a

[1] The geographical or sea-mile, 60 to 1 degree of longitude on the equator, must not be onfused with the British or Statute mile (used in this book when miles are mentioned ithout qualification) 69·2 to 1 degree or 5,280 feet in length.

globe, or, at all events, on a map of large scale. Errors due to the pr
jection may be in a large measure eliminated by treating each trapezoi
bounded by parallels or meridians, as a distinct map, the precise scale
which will, of course, have to be determined before the measurement
made. In the operation itself a "space-runner," such as can be obtaine
from any mathematical instrument maker, may prove of service.

Measurement of Areas on Maps.—The measurement of areas
most readily effected when the map is on an equivalent projection. If
plate of glass have engraved upon it small squares the relation of which
the area of the map is known, the area is obtained by placing the gla
over the map and counting the squares required to cover the countr
whose area it is desired to ascertain. Or the area may be calculate
directly with the aid of a Bar or Polar Planimeter. Another way is

FIG. 14.—*Picture Map of Part of London, showing Blackfriars Bridge, St. Paul's Cathedra
Southwark Bridge, London Bridge, the Tower, and the Tower Bridge.*

take the areas of all full quadrilaterals from a table of the areas of quad
rilaterals of the Earth's surface, such as is to be found in the "Geographic
Tables," published by the Smithsonian Institution, and add to the resu
the areas of outlying portions of quadrilaterals.

Plans.—It is obvious that the detail which it is possible to introduc
into a map depends more especially upon the scale to which it is draw
Accordingly we distinguish between plans, topographical maps, an
general maps. The scale of a *Plan* should be sufficiently large
enable separate houses and plots of land to be clearly distinguished.
scale of 1 : 500 would suffice for this purpose, and occasionally even
much smaller scale, say 1 : 10,000. As a plan only embraces a very sma
area the sphericity of the Earth's surface is not taken into account by th
surveyor, the principles of plane trigonometry alone are involved, and th
only instruments really needed are a chain, a cross-staff, and (when alt
tudes or sections are required) a level.

Topographical Maps.—*Topographical Maps* must be on a scale fficiently large to enable the draughtsman to show plans of towns and lages, roads, and other features, without excessive exaggeration. No ıp on a smaller scale than 1 : 200,000 will enable this to be done. The tails for such a map may be taken from available parish maps on a rger scale, from plane-table surveys, and even from rougher compass rveys. In combining these materials, in the case of a country of con-derable extent, account has to be taken of the sphericity of the Earth, e position of at least one point has to be fixed by careful astronomical servation, the length of a degree has to be measured, and the country vered with a network of triangles starting from a base-line and checked the course of the triangulation by one or more bases of verification. ıe first map produced on such scientific principles was that of France by

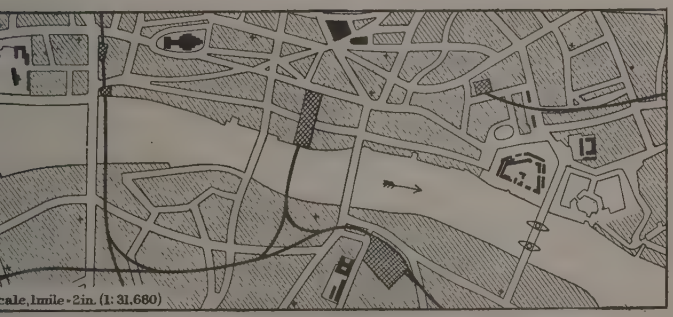

FIG. 15.—*Topographical Map of the Part of London shown in Fig.* 14.

ssini de Thury, the first sheet of which, on a scale of 1 : 86,400, was blished in 1750, and the last in 1793.

In England several counties had been triangulated about the same ne, but a regular trigonometrical survey was only begun in 1784, when eneral Roy measured a base-line on Hounslow Heath. This survey was bsequently extended to the whole of the United Kingdom. In spite of e slow progress of the work of the survey, and some details which are en to criticism, it may be safely asserted that no country of so great an ea possesses a map which can compare in accuracy with that produced the "Ordnance Survey" Office. The surveyors have supplied the ntoured lines of elevation from careful measurements, and not from ere estimates or barometrical observations, as is still the case with most ficial maps in other countries. The survey has produced town plans : 500 or 1 : 2,500), parish maps (1 : 2,500), county maps (1 : 10,560 or 6 inches the mile), and a general map (1 : 63,360 or 1 inch to the mile), as well as aps on the smaller scales of 2, 4 and 10 miles to an inch (1 : 126,720·

1:253,440, and 1:633,600). The beautiful but tedious process of engravin on copper has been largely superseded by more rapid processes. The map may be purchased at most post-offices in the United Kingdom.

Trigonometrical surveys have now been extended over the whole o Europe, except northern Russia and portions of the Balkan Peninsula The maps are published on various scales: 1:100,000 in the case of Ger many, Scandinavia, France, Italy, and Portugal; 1:75,000 in the case o Austria and Servia, &c. In addition to these general maps, the variou survey departments issue plane-table sections (*planchette-minutes*, *Mess tischblätter*, &c.), usually on a scale of 1:25,000. The publication o maps or plans on a still larger scale is, as a rule, left to be done by loca authorities.

Trigonometrical surveys outside Europe have as yet been undertake only in detached areas. India led the van in this useful scientific enter prise, its trigonometrical survey being very complete. Japan may clain credit for being the first Eastern State to have a scientific Survey De partment. In Africa a commencement has been made by the French i Algeria and Tunis, and by the British from Cape Colony. In the Unite States isolated surveys were begun in 1830, but the work has bee carried on systematically only since 1879, partly by the Coast and Geodeti Survey, and partly by the United States Geological Survey, which has topographical branch. In addition, surveys of some States have bee carried out by the authority of the State legislature. The maps vary i scale according to the nature of the country, the north-western State being on a scale of 1:62,500, the Rocky Mountain region on a scale o 1:250,000. The features of the ground are shown by contours. Th relative degree of accuracy in the mapping of the continents is show graphically in Fig. 6, p. 13.

General Maps.—Under general maps may be included all those o a smaller scale than topographical maps. Their production, where regula surveys are available, is a very simple matter. The original materials ar reduced mechanically by the use of squares, or more directly by panto graph or photography, to the scale desired. The information which it i thought right to give in view of the object which the map is to serve mus be selected with judgment. Many details have to disappear, the place o others is taken by signs or symbols, and exaggeration becomes necessary but the draughtsman must take care to bring out those features which ar most characteristic of the country delineated. This applies especially t the hills, which are too frequently merely sketched in, or omitted alto gether, on account of the cost of indicating them.

Where regular surveys are not available the map has to be compile with the help of all materials more or less trustworthy—a task involvin much labour. The compiler first of all lays down those places the positio of which has been determined by trustworthy astronomical observations he then adjusts to these points the route surveys or sketches made by ex

orers, and finally adds information derived from native sources. The sult, in many cases, hardly compensates for the labour involved in the oduction of such a map, yet, until quite recently it was the only means gaining an idea of the geographical features of the greater part of rica and of Inner Asia, and notwithstanding the progress of regular rveys, and the better work brought home by explorers, the time is still r distant when the services of the compiler can be dispensed with.

Initial Meridians.—The initial meridian now almost universally opted, in accordance with a recommendation of an International eodetic Congress, which met at Washington in 1884, is that of Green-ch; but other meridians are still frequently employed, especially in rench maps, and in those of the national surveys of other nations. The sumed meridian of the island of Ferro, in the Canaries (Fig. 453), was ace largely used on account of the convenient manner in which it divides e world into an eastern and a western hemisphere. The following is list of observatories whose meridians have been so used:—

LONGITUDE OF OBSERVATORIES.

	Longitude E. of Greenwich.			Longitude W. of Greenwich.		
	°	′	″	°	′	″
Sydney, N.S.W.	151	12	23			
Madras	80	14	50			
Bombay	72	48	55			
Pulkova (St. Petersburg)	30	19	40			
Helsingfors, Finland	24	57	17			
Cape Town	18	28	41			
Stockholm	18	3	30			
Rome	12	28	40			
Munich	11	36	32			
Christiania	10	43	25			
Brussels (Old Town)	4	22	11			
Paris (Observatoire National)	2	20	15			
Madrid				3	41	15
Lisbon (Naval Obs.)				9	8	23
Ferro, assumed as				17	39	45
Rio de Janeiro				43	10	21
Santiago de Chile (New Obs.)				70	41	39
Washington (Old Obs.)				77	3	1
Mexico				99	6	39

Delineation of the Ground.—In olden times, and occasionally en to the beginning of the nineteenth century, the inequalities of the ound were indicated by serrated ridges or groups of mole-hills, varying size and number in accordance with the supposed height, extent, and haracter of the mountain ranges they were intended to represent. Only ccasionally did a draughtsman rise above this inartistic level and give a cturesque outline to his hills, by drawing them in perspective, or tempting to portray their characteristics by washes in ink.[1]

Hatchings (*hachures*) were first introduced in the beginning of the ghteenth century. The method was fully developed in La Condamine's ap of Quito, published in 1751, and popularised by Arrowsmith. In this ude system of hill shading almost everything is left to the judgment and tistic skill of the draughtsman. A scientific basis for delineating the features the ground was first supplied by Philip Buache in 1737, when he placed efore the French Academy a map of the Channel, on which the configura-on of the sea-bed was indicated by contour lines, *i.e.*, lines which run

[1] Instructive examples of early attempts at hill sketching are the wonderful maps awn by Leonardo da Vinci (1452-1519), K. Türst's "Landtafel" of Switzerland (1495), ian's map of Bavaria (1568), and Gyger's map of the Canton of Zürich (1667).

through all points at the same level, like the line of contact of sea and lan in calm weather. He suggested that this method might advantageously b extended to the delineation of the land, and this was done for the first tim in 1791, when Dupain-Triel published a contoured map of France. scientific framework or skeleton for delineating the ground had thus bee furnished ; the contour lines drawn at equal intervals sufficing, if numero

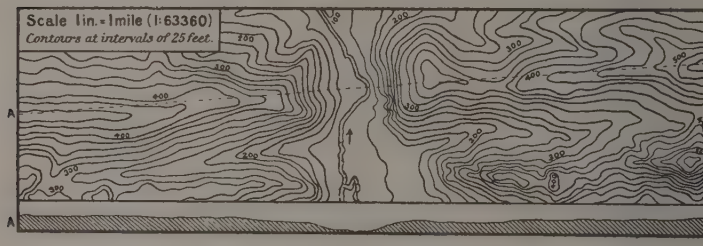

FIG. 16.—*The Guildford Gap : Contoured Map.*

enough, not only to show the actual height of the land but the form an gradient. Crowded contour-lines indicate a steep slope, contour-lines f apart a gentle slope.

Something more than contour-lines was needed to give plasticity maps. Various methods have been introduced for effecting this purpos By increasing the number of contours the shape of the hills can b

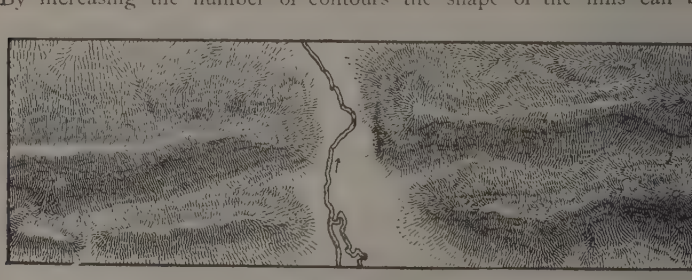

FIG. 17.—*The Guildford Gap : Hills shaded.*

brought out more distinctly, and this "Horizontal style" yields ve satisfactory results if well done. Another method consists in covering th contours with hatchings crossing them at right angles, and thus drawn the direction of the greatest descent. This is the "Vertical style Lehmann (1783) proposed that the scale of shade should correspond to th degree of declivity, and that the map should be supposed to be illuminate vertically. His principles have met with very general acceptance, and

ow admitted that only a combination of contours (preferably printed in
olour different from that of the hill shading) with hatchings, can yield
atisfactory representation of the features of the ground. There are,
ever, cases in which an oblique illumination may yield better results,
washes of Indian ink or tints may be substituted for the hatchings.
colour-printed Ordnance Survey maps illustrate both methods.

Another method for bringing out the vertical structure of a country in
general features, is that of tinting the intervals between the contours,
producing a "strata map." Where the number of these "strata" is
ted the same tint may be employed throughout, its depth increasing
the altitude, but where the features to be shown are more complicated
ay become necessary to employ various colours, and upon their judi-
s selection must depend the beauty and expressiveness of the map.

The Orthography of Geographical Names.—Care should be
n that the orthography of geographical names should enable the reader
map to pronounce them with at least approximate correctness. The
s laid down by the Council of the Royal Geographical Society
uld therefore be adhered to as far as possible. They are exceedingly
ple. Names in countries using Roman letters are to be retained as
t by the respective nations, as are also names in other languages which
ong usage have become familiar to English readers. All other names,
ever, are to be spelt phonetically, as pronounced on the spot. The
els are to be sounded as in Italian, the consonants as in English, and
redundant letters are to be introduced.[1] The diphthong *ai* is to be pro-
nced as in *aisle ; au* as *ow* in *how ; aw* as in *law*. *Ch* is always to be
nded as in *church ; g* is always hard ; *y* always represents a consonant ;
lst *kh* and *gh* stand for gutturals. One accent only is to be used, the
te, to denote the syllable on which stress is laid. It is obvious that in
nerous instances these rules must prove altogether inadequate when
mpting to express the sounds of a foreign language. The admission of
itional diacritical marks such as ¯ and ˘ to express quantity, and the
resis, as on *aï*, to express consecutive vowels, which are to be pronounced
arately, would prove of service, but in all cases where greater precision
imed at, recourse must be had to such an alphabet as that of Lepsius,
to an alphabet specially adapted to the language the sounds of which
proposed to reproduce.

The Board of Geographic names in the United States acts upon rules
ctically identical with those indicated above, and compiles an official list
place names, the use of which is binding on Government departments.

Maps for Special Purposes.—These are most varied in their con-
ts. The most ancient among them are route maps—the *Itineraria picta*
the Romans—and marine charts ; the most recent are maps illustrating
physical geography of the globe.

[1] Yet the rules say that all vowels are shortened in sound by doubling the following
sonant.

Charts (from *charta*, paper) are designed for the special use of sailors, and prominence is given upon them to every feature a knowledge of which is requisite for safe navigation. They show more especially the depth of the sea, taking *low* water as a standard or datum level, and not the *mean* level of the sea, as is done in topographical maps. Charts, as a rule, are laid down on Mercator's projection, the advantages of which to a navigator are pointed out on p. 23, and sometimes on the Gnomonic projection, on which all great circles appear as straight lines.

Geological Maps date no further back than the latter part of the eighteenth century, and to the United Kingdom is due the credit of having been the first to organise a regular geological survey, in 1835. The utility of these surveys, quite apart from the scientific interest attached to them, is so apparent, that at the present time there is hardly a civilised State without its Geological Office or Department of Mines; nay, in parts of the United States and in some of the colonies geological surveys were inaugurated simultaneously with a general survey of the country.

There is no department of physical geography which it has not been attempted to illustrate cartographically, since Athanasius Kircher, in 1665, published the first physical map—one illustrating ocean currents. The surface features of the land and configuration of the ocean-bed; drainage basins; the phenomena of the atmosphere; the distribution of plants and animals; and, in short, every form of distribution over the Earth's surface is capable of being illustrated by means of maps. Maps showing roads and railways are in daily use; others illustrating the distribution of the population according to density, race, language, or religion; vital statistics, and every department of social or industrial life are being more and more appreciated. Maps have likewise proved of inestimable service to the student of history.

The ingenuity of compilers has been taxed to the utmost in efforts to present the facts of geographical distribution in an intelligible and striking manner. Density of population, for instance, is generally indicated by a graduated tint, but two or three tints might be employed, one to cover those parts of the country where the density approaches the mean, the two other tints indicating those parts where it falls short of the mean, or exceeds it. This method, greatly generalised, is shown in Fig. 18. It is obvious that the same principle is applicable in numerous other instances or where the feature mapped is the varying degree of a certain condition.

Relief Maps.—It is claimed on behalf of maps in relief that they present a better portraiture of the inequalities of the ground than is possible in the case of plane maps. This contention, however, can only be admitted on the understanding that the heights are not exaggerated to an extent which would yield a caricature instead of a picture true to nature. A fair amount of exaggeration may be admissible in the case of relief maps on a small scale, but is altogether objectionable where the scale is

large. Relief maps of more extensive countries, moreover, should be built up on a spherical surface, or the relief loses all claim to naturalness.[1] So-called strata reliefs, built up in steps from the strata of a contoured or hypsographical map, are altogether objectionable.

Globes.—A globe is the only means of conveying a faithful idea of the distribution of land and water over the entire surface of the Earth. This advantage was early recognised, and Crates of Mallos is credited with having produced the first terrestrial globe. Globes of an early date are frequently referred to, but the oldest which have survived to our day are one by Behaim (1492), now at Nürnberg, and the so-called Laon globe, now at Paris (1493). These ancient globes are either drawn by hand or engraved on metal. Globes of this description were naturally very expensive, and Hylacomilus (Waldseemüller) has consequently deserved well of the student of geography, when, in 1507, he printed a map of the world upon gores intended to be pasted upon a globe, thus placing this most indispensable educational apparatus within the reach of all. They may now be had of all sizes and at a low price. The globe is not only an atlas on a uniform scale, without distortion, but a valuable mathematical instrument by the aid of which important calculations may be easily made.

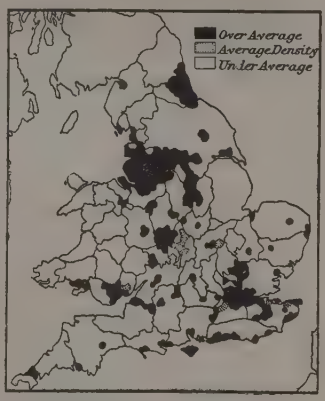

FIG. 18.—*Density of Population in England and Wales.*

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[1] This was proposed to be done by Maestlin in a letter to Kepler (1596), by Hauber (1724), and apparently first acted upon by Erben, of Stuttgart, about 1850. The oldest relief of which I have any notice is one of Antibes (1665).

CHAPTER IV.—THE PLAN OF THE EARTH

By J. W. Gregory, D.Sc., F.R.S.,

Professor of Geology in the University of Glasgow.

General Resemblances.—The vast unknown interior of the Earth is bounded by a shell composed of two layers, the solid rocky crust, or "lithosphere," and the seas and oceans, or "hydrosphere." If the Earth has solidified from a gaseous nebula, then there may have been a stage when the whole lithosphere was covered by an unbroken sheet of water. But now, as through all the ages revealed by geology, the rocks have been piled up in broad masses or high mountain chains which rise above the level of the hydrosphere, while the waters are collected into the intermediate depressions. The geographical distribution of the exposed portions of the lithosphere appears, on first inspection of a map, to be so irregular and complicated, and the continents to differ so much in topographic form that their arrangement appears haphazard and accidental. But if we ponder over a map of the world we detect a series of striking coincidences and of repetitions of the same essential forms. There is, for example, a remarkable resemblance in the general shapes of the masses of land and water. Thus, the greatest of the land areas, the Old World, consists of a vast triangle, of which the base extends from Norway to Bering Strait, with the apex at the Cape of Good Hope. The greatest of the oceans is the similar but inverted triangle of the Pacific. Again, the New World consists of two triangles, one contracting from the barren steppes of the Arctic shores to the Isthmus of Panama, and the other contracting from the triple Cordillera of Colombia and the high scarp of Venezuela to the ridge of Cape Horn. And much as the Old World corresponds to the Pacific, so the two Americas correspond to the two basins of the Atlantic, and the Arctic Sea to the Antarctic land. In the coast lines of the continents other points of correspondence reveal themselves. The Pacific coasts are steep and high, and are formed in the main by mountain ranges parallel to the shores; its Asiatic coast is hung with festoons of islands, and remains of similar island chains occur off its American coast. The Atlantic shores, on the contrary, are low and shelving, except where they pass round the margins of high plateaux or cut across mountain chains, of which the directions are rarely parallel to the shores. The islands are few and irregularly scattered instead of being hung in festoons. Moreover, both Atlantic shore lines follow the same course, as if moulded by the same influences; thus the Gulf of Guinea occurs opposite the projection of Brazil; the Mediterranean offset on the east

rresponds to the Caribbean on the west; the eastward recession of urope is followed by the eastward advance of America.

Geomorphological Theories.—Such resemblances have been peatedly pointed out by geographers. For example, most elementary xtbooks remark the southward tendency of peninsulas. It has, therefore, ng been a favourite idea of geographers that the main outlines of the ntinents are not accidental, but have been determined by some undis-vered principle or law. A quartz crystal, with its massive form, its mple outline, its flat faces, and straight edges, appears to have no point common with a snowflake composed of a radial cluster of delicate, athery tufts. But the crystallographer recognises that the two different rms belong to the same crystalline system, have the same hexagonal mmetry, and are built on the same fundamental plan. Similarly geo-aphers have believed that veiled by the great variety in topographical tails there is some underlying symmetry in continental form, the dis-very of which is the main problem of geomorphology. The mediæval heel maps may be regarded as early attempts to express geomorphological eories, which rested on a theological basis. But it was not until the neteenth century that any satisfactory beginning was made. In 1684 urnet, in his "Theory of the Earth," had called mountain chains "the ckbones of the continents"; and that idea has so long been popular that e effort to discover the principle governing the evolution of the continents turally began with the study of the origin of mountain chains. The first rmal theory of geomorphology, that enunciated by Elie de Beaumont in 52, was based on the hypothesis that mountain chains having the same ientation were formed at the same date by the same causes. If, there-re, the age of a certain mountain chain be required, all that is necessary, cording to Elie de Beaumont's system, is to determine its orientation and mpare it with a standard scale in which the directions of a considerable ries of mountain chains are marked. This system failed as it was too nbitious. The effort to state a theory with mathematical precision, and make it of universal application, led to exaggeration of the truth on nich it rested. The theory was soon found to be inconsistent with sential facts and was discredited. But Elie de Beaumont's effort to rrelate Earth-movements over extensive tracts of the Earth's surface was t in itself chimerical. Geological, physical, and astronomical considera-ons all support belief in a certain connection between some distant ountain chains. Thus among the mountains of Europe and western sia, which trend east and west, the two that agree most closely in orien-tion are the Pyrenees and the Caucasus; and as Prof. Bonney has shown, ey agree most closely in geological structure, and were probably elevated the same date. Lowthian Green has proposed a physical explanation of e triangular form of the land masses, and why the triangles should be sposed as they are. And Sir George Darwin has suggested an astronomical use of the phenomena, by pointing out some coincidence between the

distribution of land and water with lines of strain in the Earth's crust caused by some early incidents in its history.

Relative Permanence of Continent and Ocean.—Nevertheless, after the overthrow of Elie de Beaumont's system, the interest in geomorphology was lessened by the influence of Lyell's teaching; for his axiom of the continual interchange of land and sea, owing to the alternate elevation and depression of the land by local independent agencies, threw doubt on the existence of any one steady general cause. Lyell's theory received its first severe check from the diametrically opposite view of the permanence of the continents and ocean basins. In the oceanic abysses various oozes are now being deposited. Nothing exactly like these oozes is met with among the rocks forming the continental masses, except for a few patches on the rims of the ocean basins. The sediments which form the continents resemble those which are being deposited in shallow seas, in lakes and rivers, or on land. "The vast grey level plains of ooze where the shell-burr'd cables creep" of the existing ocean floors, have apparently never been raised above sea-level. This fact has been cited as conclusive proof of the permanence of the ocean basins; but if we neglect deductive negative evidence and study the actual history of different parts of the Earth, we find that the conceptions of continuous oscillation and of prolonged immutability are both true in part. Some land areas have been permanent from a very early period of geological history; others have been subject to alternate movements of elevation and depression, accompanied by the contortion and crumpling of the beds. Thus, on the one hand, the great block of Scandinavia, Lapland, and Finland, the central highlands of Brazil, the plateau of Labrador, the peninsular area of India, the meseta or central plateau of Spain, are each composed of extremely ancient rocks; their margins have been repeatedly washed by the sea, but they themselves have never been below sea-level. On the other hand, the British Isles, Portugal, the Atlantic States of America, Japan, and northern India have been repeatedly submerged beneath the sea. The test of actual inspection cannot be applied to the ocean floors, but the submarine parts of the lithosphere are probably subject to the same movements as the areas now above sea-level. Strong support to this view is given by palæontology, one aspect of which becomes meaningless, if we believe that the land masses have always been separated by the existing ocean barriers. Hence it is now widely thought that the view that every part of the ocean floor now below the depth of a thousand fathoms has always been below sea-level, is as exaggerated as the old Lyellian doctrine. But it was a most useful protest, for with the limitation of Lyellism, geomorphology advanced again. In a brilliant address to the British Association in 1892, Professor Lapworth described the continents as arches formed by vast Earth-folds, while the ocean basins are the sunken troughs between the raised continental arches. Lapworth's fold theory has not, however, yet been stated at length, and Suess's great work on the face of the Earth ("Das Antlitz der Erde")

ains the only modern attempt to describe the physical geography of world in accordance with a definite system of geomorphology.

To understand Suess's views, we must comprehend the nature of the ements which affect the level of the Earth's crust. According to the llian school the Earth is undergoing continual oscillation, areas sinking ising either as wide, continental masses, or by the contortion of belts mountain chains. This interchange was attributed to variations in the ght of the land and not to changes in the level of the sea. Thus in thern Scandinavia the sea has been receding, while in the southern part hat country it has been encroaching on the land. According to Lyell was because the ground was rising in the north and sinking in the th. Round the British coasts there are raised beaches in some places, submerged forests in others, facts which were similarly explained by assumption of differential movements in the land. But the phenomena be equally well explained by variations in the level of the sea. The -level is not a fixed, definite level. The old maxim that "water will find own level" may be true within the narrow range of a set of water-pipes, the water of the sea knows no level. Water in a glass is raised around margin owing to the capillary attraction of the sides. In the ocean ins the waters are heaped up against the continents by the gravitational raction of the land, and they are thus depressed in the middle. In the e of land-locked seas the theoretical water-level is disturbed by the ion of winds and currents, just as the water in a lock is heaped up inst the sides when a strong current flows into it. Again, the amount vater on the Earth is limited, so that if the depth of the oceans increases ir area must lessen. Taking the mean depth of the Pacific Ocean at 000 feet, if its floor were to sink until the mean depth is 1,000 feet vater, then the sea-level throughout the globe would be nearly 500 feet er; the land would appear to have risen to that extent without the ghtest actual movement of its own.

Suess's Theory of Changes in Sea-level.—Such variations in -level are not only possible but probable, and there is some strong geo- ical evidence of their occurrence. On the western shore of Calabria re are some old beach lines which rest in one place on the face of a ff of Miocene limestone, in another traverse a spur of the Appennines, ewhere lie on the Archæan schists of the Peloritani, and on the recent canic tuffs of Etna. The old beach lines, however, maintain their horizon- ity throughout. Western Scotland furnishes a similar illustration, for a beach there, at the height of 100 feet above the sea, lies on rocks of ferent ages and hardness, and it crosses undisturbed great faults and locations. Suess holds that it is physically impossible for such complex eas and rock masses to be upraised without any relative displacement of e different parts. Hence he argues that where we find broad tracts of sed marine deposits maintaining their original horizontality, we must ribute their position to movements of the hydrosphere instead of to those

of the lithosphere. This contention is essential to Suess's theory of geomorphology. The subsidence of wide areas and the elevation of narrow bands can both be explained by the radial contraction of the globe. But that agency will not account for the undisturbed elevation of extensive areas. If such elevations do occur, then there must be some other factor at work, and we cannot hope for any complete theory of geomorphology until the nature of this unknown cause be discovered. But if there be no such movements then we know already an adequate cause for all the movements in the Earth's crust.

Suess's theory, then, is simply that the movements of the lithosphere may be divided into two groups—(1) The *subsidence* of wide areas where, owing to the contraction of the Earth's interior, the crust is left without support; (2) the *folding* and contortion of rocks along certain lines whereby the rigid crust is able to contract into a smaller space. Between the fold-lines, and beside the sunken lands, crust-blocks stand up like the piers of a bridge of which the arch has fallen in. Suess's great contribution to geomorphology is, that he has shown that the existing structure of the world can be explained by these two sets of movements. Each of the continents consists of lines of fold-mountains, or blocks of strata which have been left standing above the level of the ocean basins formed by subsidence.

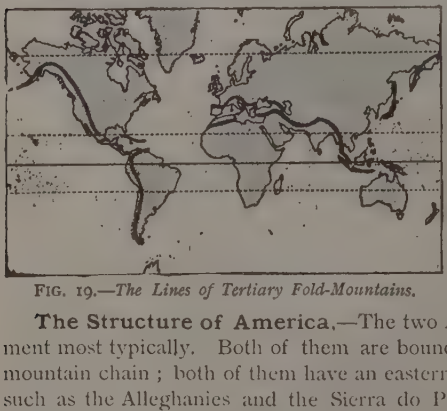

FIG. 19.—*The Lines of Tertiary Fold-Mountains.*

The Structure of America.—The two Americas show this arrangement most typically. Both of them are bounded to the west by a long mountain chain; both of them have an eastern border of fold-mountains, such as the Alleghanies and the Sierra do Paranão. The north-eastern corner of each is formed of a block of Archæan rocks, neither of which has apparently sunk below sea-level since the earliest days of geological history. In both continents a vast basin occurs between the bounding lines of fold-mountains. And the geological history of the two Americas has been aptly summarised as the history of the gradual filling up of two great gulfs which occurred between the eastern and western ridges.

The Structure of the Old World.—The structure of the Old World is less simple, for the land is broader and more complex. Its main fold-line runs from east to west instead of from north to south. It is usual to associate Europe and Asia as the continent of Eurasia, to which the part of Africa north of the Sahara is added on biological grounds. But from the standpoint of geomorphology we cannot separate central and southern Africa, unless we also exclude the peninsular area of India. The

at land mass of the Old World is divided into two by a belt of fold-
ntains which runs from the Atlantic to the Pacific. The southern
gin of this belt follows the Atlas Mountains, crosses Tunisia, and passes
h of Malta and south of the Greek Archipelago; it continues east
g the Taurus, bends northward beside the Persian Gulf, and continues
former direction past Baluchistan and the northern foot-hills of the
alaya; then it runs south again across Burma and the Malay Peninsula,
turning eastward once more crosses the Malay Archipelago, until it
s below the Pacific. This line divides two regions which have quite
erent geological structures. South of it is a series of table-lands of
t geological stability and antiquity. North of it is a vast tract in which
rocks are mostly horizontal or gently inclined, and only violently
torted along the lines of the great mountain chains, the directions of
ch are moulded by blocks of old rocks, such as the Central Plateau of
nce, the Alpine Foreland in South Germany, and the *massif* of Bohemia.
eries of subsidences along the southern margin of the northern divi-
has formed the basin of the Mediterranean, the Black Sea, the Persian
f, and the Indo-Gangetic plain; and this series appears to be a direct
tinuation of the Caribbean depression which separates North and
th America.

The Origin of the Oceans.—So far for the structure of the conti-
ts. Their shapes are necessarily determined by the surrounding oceans,
cerning the history of which direct geological evidence is scanty.
casional islands tell us a little, and a little more may be inferred from the
nd of the rocks and mountains on the continental margins, and from the
angement of the suboceanic ridges. The subject is speculative and con-
ersial; but it seems to be generally agreed—by geologists at least—that
ocean basins have been formed by subsidences at different ages. Thus
Atlantic Ocean may date from middle Cainozoic times. According to Suess
Atlantic Ocean results from the gradual enlargement of two gulfs which
jected north and south from the old Mediterranean Sea that extended
m Central America to the Levant. The Arctic Sea may have been
med at the same period. The *Indian Ocean* is probably older. It appears
ave originated by the subsidence of the section of Gondwanaland that
ted India and Africa, of which the Archæan rocks of the Seychelles and
uritius are remnants. The *Pacific Ocean* may have undergone great
nges later than the other oceans. It has certainly encroached upon
stralia by the subsidence of the submerged portion of the Melanesian
lform, which extended northward and eastward from Australia as far as
w Guinea, New Caledonia, Lord Howe Island, and probably New
land. Beyond this crescentic line of continental islands are the oceanic
ts of Micronesia and Polynesia, which range through more than 100°
ongitude. According to Darwin's theory of coral islands these chains
rk the site of a sunken land. The Patagonian platform projects from
uth America to meet the southern island chain, and some indications

of a former land connection along this line are given by the evide of zoological distribution. In the North Pacific the evidence is m scanty. The island festoons off the coasts of Asia and America, and transverse ridges that run east and west across Central America indica former seaward extension of the land. But, unless the series of isla from Hawaii to the Tonga group represents a line of movement, all evidence in the north central Pacific has been lost.

The Test of a Geomorphological Theory.—This rapid sur indicates the nature of the evidence, which shows that the structure of t the oceans and continents is consistent with the hypothesis that th distribution has been determined by the subsidence of some regions consequence of the withdrawal of underground support, and by the ele tion of certain lines by the compression of the hard crust into a sma space. Both movements would result from the radial contraction of globe during cooling, but unless this cause will also explain the distribut of these two types of Earth-movements, it will not give us an adequ theory of geomorphology

The three fundamental facts of distribution which any theory m explain are the *antipodal position* of the continents and oceans, their *tri gular shape*, and the *excess of water* in the southern hemisphere. Elie Beaumont's theory gave no answer to any of these questions; but it led another geometrical theory which does. Elie de Beaumont attached much importance to linear symmetry. He assumed that the Earth i spheroid built up on a rhombic dodecahedron, which is a symmetrical bo enclosed by twenty-four equal pentagons. Every face of a rhom dodecahedron is opposite to a similar parallel face. Antipodal areas similar. But on the Earth antipodal areas are dissimilar, for a land area at end of an axis is always balanced by an oceanic area at the other end of axis. In fact, in crystallographic language, the lithosphere may be descri as hemihedral, not holohedral. Moreover, if we could cover two-thirds of rhombic dodecahedron with a fluid held on to it by attraction from centre of the body, just as the waters of the ocean are held on to Earth by gravity, there is no reason why an excess of the fluid sho collect on one half.

The Tetrahedral Theory of the Earth.—Lowthian Green p posed what is known as the "tetrahedral theory," which regards globe as based on a form which satisfies the requirements of the case be than a dodecahedron. The body which encloses the greatest volu for a given surface is the sphere. The regular body which contains smallest volume for a given surface is the tetrahedron, which is enclo by four equal equilateral triangles. Hence every hard-shelled sphere wh is diminishing in size owing to internal contraction, is constantly tending become tetrahedral in form. In the case of the Earth various circumstan such as its rotation, and the attraction of the moon, render such a fo impossible. But if we replace the flat faces of the tetrahedron by con

ces, we get a body which approximates to a spheroid ; and by varying the ırvature of the faces this puffed out tetrahedron may pass into the condi-on of a spheroid and then become truly spherical. Conversely, if a hollow ohere composed of an elastic shell be gradually exhausted of air, the xternal pressure will force in the four faces and gradually make it tetrahe-ral. The tetrahedral theory regards the world not as ı angular tetrahedron, but as a spheroid which has een subjected to this tetrahedral flattening to an ex-ent inappreciable by direct measurements, but in-irectly recognisable owing to its influence on the istribution of land and water. As the flattened faces re nearer the Earth's centre of gravity, the water will ollect upon them. The ratio of the areas of land to hat of water on the globe is as 2 to 5. If on a model of a tetrahedron we olour the five-sevenths of the surface that is nearest the centre, the oloured area will indicate where the water would accumulate on a ıtionary tetrahedron. Mount the tetrahedron with one of the four points ointing downward, when one face will be horizontal t the top ; on that upper face there will be a central oloured area in the position of the Arctic Sea. It ill be surrounded by a land belt, from which three rojections will run southward down the vertical dges from the three upper angles. These south-ard land areas will each taper gradually to a point, eyond which there will be a continuous belt of water urrounding a south polar land. That is to say, that n the model the general plan of the arrangement of land and water s identical with its actual distribution on the globe ; for the geographical nits are subtriangular with the land triangles pointing to the south ; and and water are antipodal ; and there is a great excess of water in the outhern, and of land in the northern hemispheres.

FIG. 20.—*Tetrahedron.*

FIG. 21.—*Tetrahedron with curved faces.*

The agreement between the facts of geography nd the tetrahedral theory goes further. The four aces of a tetrahedron meet along six edges, and if he Earth be subject to tetrahedral strain, these six dges should be represented on the Earth by lines of veakness. The lines of weakness would be marked oy lines of crumpling, *i.e.*, by ranges of fold-moun-ains. The question therefore rises, does the main old-mountain system of the world bear any relation o the traces of a set of tetrahedral edges?

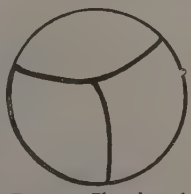

FIG. 22.—*The edges of the tetrahedral Earth.*

Terrestrial Symmetry.—If an observer were to look down on the Earth from the direction of the Pole Star, he would discern a central sea urrounded by a ring of land, broken only by the shallow Faroe Channel, Smith South, and Bering Strait. The northern face of the world consists of a

cone of land of which the apex has fallen in ; if this northern land-cap were to sink still further, its margin would be thrust out in all directions. Now Suess has shown that the whole continent of Eurasia, as geologically defined is bounded to the south by a chain of fold-mountains formed by lateral thrusts from the north. In Eurasia the predominant mountain chains run east and west, parallel in fact to the edges that bound the upper face of the tetrahedron. South of Eurasia the predominant mountain chains, rock-foliation and strikes run north and south, parallel again to the tetrahedral edges that run vertically from the tetrahedral "equator" to its south pole, hence there is a general agreement between the position of the fold-mountains and the lines of tetrahedral strain.

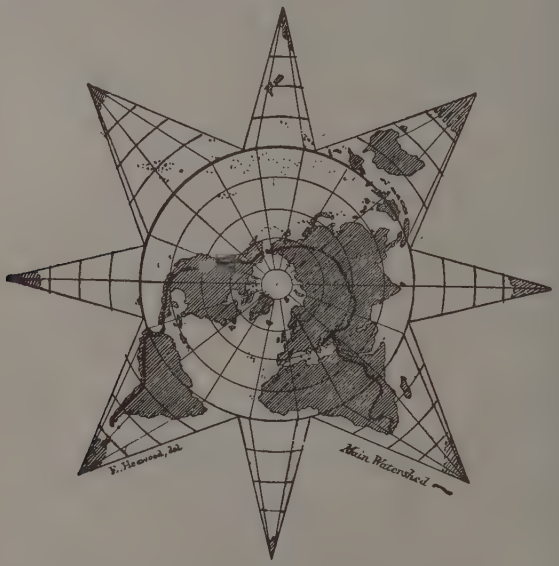

FIG. 23.—*Symmetry of the land round the North Pole.*

The agreement, however, is not absolute. For example, one of the points which, according to Green, should be a land centre, falls in the Pacific near the Ladrone Islands. But if Darwin's theory of coral islands be true, then that area was once continental, and has only become oceanic by subsidence in Cainozoic times. Again, Africa lies so well along one of the three vertical edges of the tetrahedron, that South America might be expected to occur on the next similar edge to the west ; but South America actually is 20° too far to the east. Green remarked the discrepancy, and explained it by invoking an eastward torsion of the southern hemisphere, due to its tendency to increase its rate of revolution owing to its decrease in diameter

But the geological evidence suggests another explanation. The western coast of Patagonia is formed by a belt of Archæan rocks, which disappear eastward under the Cainozoic sediments, the islands of Chilean Patagonia also consist of Archæan rocks, which may extend westward as the basis of the great submarine Patagonian platform. And just as the Indian peninsula is regarded as the remnant of a continent of which the western part has been lost by subsidence, so the Patagonian peninsula may be regarded as the eastern remnant of a sunken land, the position of which would agree with the theoretical scheme.

But we have no right to expect in our old and wrinkled world that the lands should be arranged with geometrical regularity. The lithosphere varies in composition; certain regions consolidated at a very early period into great impassive blocks, which have forced the later foldings to diverge from the course they might have followed in a homogeneous crust. Further, there is nothing in the tetrahedral theory inconsistent with some variation in the position of the tetrahedral axes; hence, during the gradual shrinkage of the globe, there may have been considerable variation in the position of the lines of strain. "The physiognomy of the globe," says Lapworth, "is an unerring index of the solid personality beneath." The present physiognomy, however, is not an index of the full life history of the continents. The features of past ages must be inferred from the physiognomical fragments of the ages that remain to us. We cannot infer from the existing distribution of land and sea how that distribution has been produced. The problem is so complex and the facts so uncertain, that the historical method of inquiry is safer than the deductive method. A knowledge of the distribution of land and sea at various epochs in the world's history appears to be the only sure basis on which to rest a system of geomorphology.

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CHAPTER V.—LAND FORMS: THEIR NATURE AND ORIGIN

By Hugh Robert Mill, D.Sc.

Vertical Relief of the Earth's Crust.—Although, as has been explained in the description of the plan of the Earth, which dealt with the grand features of the crust, the geoid, or form of the actual surface of the ocean, is distorted from the true figure of the Earth, it is yet the only practical zero-surface from which heights and depths on the Earth's surface can be measured. Until the amount of the distortion of sea-level at different places is found, it is impossible to compare exactly the heights of distant continents or the depths of different parts of the oceans. The uncertainty probably amounts to some hundred feet in the most careful measurements. A comparatively small number of points of the ocean bed have as yet had their depth below actual sea-level ascertained, and only a few of the civilised countries have had the configuration of their whole surface determined by levelling. The large relations of vertical relief can therefore only be roughly estimated by making certain assumptions as to the unmeasured and unexplored regions. Such calculations have been made by several physical geographers, the latest and most elaborate being those of Professor Wagner of Göttingen. According to his results the mean level of the solid sphere is 7,500 feet below actual sea-level; but since his calculations were made the discovery of the great depth of the Arctic Sea and some very deep soundings in the Pacific and Southern Oceans show that the dividing line between the elevated and depressed regions of the crust must be drawn at a lower level, although probably not so deep as 10,000 feet, the depth which I estimated from Sir John Murray's earlier work. In Professor Wagner's hypsographic curve here reproduced in a simplified form (Fig. 24), the results of his calculations are shown graphically. The vertical lines in the diagram represent areas of the Earth's surface in percentages, the horizontal lines show depths beneath and heights above sea-level in feet, and the curve thus gives at a glance the extent of the surface lying between any limits of vertical distance.

Divisions of the Earth's Crust.—Sir John Murray distinguished three areas of the lithosphere—(1) the *Abysmal Area*, a vast and relatively uniform depression covering nearly half the surface of the Earth, mainly in the southern hemisphere; (2) a *Transitional Area* occupying less than a quarter of the surface and sloping up to (3) the *Continental Area*, which

xtends over rather more than a quarter of the surface, mainly in the orthern hemisphere. Professor Wagner, however, distinguishes the five livisions shown in the diagram—(1) the *Depressed Area* occupying 3 per ent. of the Earth's surface and comprising all the oceanic depths from he greatest (the deepest spot known in the ocean is 31,610 feet or 5,269 athoms) to 16,400 feet or 2,733 fathoms below sea-level; (2) the *Oceanic Plateau*, the vast undulating expanse from the depth of 16,400 feet up to ,500 feet, the mean level of the surface of the lithosphere, and covering 4 per cent. of the surface of the Earth; (3) the *Continental Slope* reaching hence to the edge of the Continental Shelf, or 660 feet below actual sea-level, and occupying 9 per cent. of the surface; (4) the *Continental Plateau* from the edge of the Continental Shelf to an altitude of 3,300 feet, or 28 per cent. of the surface; and (5) the *Culminating Area* comprising the 6 per cent. of surface above 3,300 feet. The Oceanic Plateau, although more gentle in the outline of its forms than the other divisions of the lithosphere, is by no means featureless. There are many broad rises which subdivide the oceanic depths without approaching the surface,

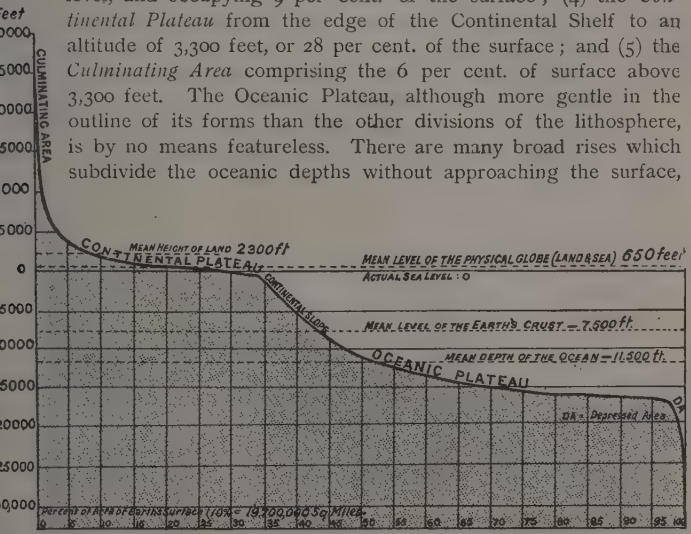
Feet
CULMINATING AREA
MEAN HEIGHT OF LAND 2300ft
CONTINENTAL PLATEAU
CONTINENTAL SLOPE
MEAN LEVEL OF THE PHYSICAL GLOBE (LAND & SEA) 650 feet
ACTUAL SEA LEVEL: 0
MEAN LEVEL OF THE EARTH'S CRUST — 7,500 ft.
MEAN DEPTH OF THE OCEAN — 11,500 ft.
OCEANIC PLATEAU
DA
DA = Depressed Area.
Percent of Area of Earths Surface (100% = 197,000,000 Sq. Miles)

FIG. 24.—*The Hypsographic Curve. Adapted from that of Professor Hermann Wagner.*

out frequently forming the foundations whence more abrupt eminences ower upwards into islands; and in some places these abrupt heights rise even from the deeper parts of the ocean bed.

The Continental Plateau may be conveniently subdivided into the Continental Shelf, Depressed Lands, Lowlands, Uplands and Highlands which merge in the Culminating Area. The *Continental Shelf* slopes very gently from the coast down to about 100 fathoms or 200 metres (600 or 660 feet). In some places, such as the west coast of South America

or of Africa, it is only a few miles wide; but in others, *e.g.*, off north-western Europe and south-eastern South America, it stretches for several hundred miles from land. It unites all the large continental islands to their nearest continent, with the exception of Madagascar, New Zealand, and Celebes. Sailors speak of this zone of shallow sea as "in soundings," because it is always possible to use a hand-lead for finding depths less than 100 fathoms; and its boundary is a matter of importance, since a vessel "out of soundings" is usually free from the risk of running on shore. *Depressed Lands*, which lie below sea-level, are of very small extent, occurring only in the Dead Sea rift-valley, the subsiding delta of Holland, and some dried lake beds in the deserts of Asia, Africa, and North America. The contour line of 660 feet (200 metres), which corresponds to the mean surface of the actual globe (lithosphere and hydrosphere combined), may appropriately be taken as the upper limit of the *Lowlands*. It is interesting that the present position of sea-level is almost midway between the outer edge of the shallow Continental Shelf, say 600 feet below sea-level, and the inner edge of the lowlands, say 600 feet above sea-level, a total area of 22,000,000 square miles, and the flattest part of the Earth's surface of equal extent except the floor of the Oceanic Plateau. For *Uplands* the upper limit 2,000 feet, nearly corresponding to the average elevation of the whole land of the globe, may be assigned; while all above that elevation may be called *Highlands*.

Classification of Land Forms.—The grandest contrast in the relief of the crust is that between the vast sunk plains of the ocean floors and the elevated surface of the continental world-ridges. The primary practical division is, of course, that into land and water; with subdivisions into oceans, seas, incurves, gulfs, and lakes for the water; and for the land on strictly similar lines into continents, outcurves, peninsulas, and islands. The land may indeed be viewed as entirely composed of islands, for every continent is either an island or part of one; but the distinction between continent and island or peninsula, though one of rank only, is convenient because continents possess a distinctive individuality not shared by smaller islands, and there is no more risk of confusion of ideas than is involved by the classification of the strength of a regiment into officers and men.

From the geographical point of view land-forms are best considered, in their larger aspects at least, from the point of view of form alone without reference to their geological history. No definite system of classification has yet been generally adopted; but the need of arriving at a common understanding on the subject is recognised by the geographers of all nations, and tentative schemes have been put forward by Professor Penck and others. The following attempt to describe some of the more important kinds of land-forms is neither complete nor altogether consistent; but it may help the student to understand the descriptions of

countries in Part II. It may also form a basis for criticism and fuller discussion.

The simplest form-elements are the plain, hollow, cliff, mountain, hill, and valley. The *Plain* is a nearly level or gently sloping expanse, which may be a sunk plain if depressed below sea-level, a low plain if on the lowlands, an upland plain in the uplands, or a high plain if it occurs in the highlands. A *plateau* or *tableland* is strictly an upland or high plain which is bounded on all sides by a more or less abrupt descent to lower ground, or perhaps bordered in part by mountain ranges which are low in comparison with its breadth. An extensive plateau may be crossed by mountain ranges or deep valleys; but a highland composed of mountains and valleys alone has no right to the name of plateau. The Pamirs, for example, do not form a tableland, but only a lofty and diversified highland for which a specific name might well be devised.

The *Hollow* is a land-form which is bounded entirely, or nearly so, by higher land. When its floor is flat it is often called a hill-girdled plain; when more typically it slopes towards the centre it is appropriately termed a basin, or if amongst mountains an intermont basin. If the word basin were not also loosely used for the whole drainage area of a river system it might be adopted for this land-form alone, and it is used in this sense by many authors. Perfect hollows of dry land can only occur in arid regions, where they frequently contain salt-lakes or beds of salt. In moist climates they are necessarily occupied by lakes, although incomplete hollows are usually drained by a river.

The *Cliff* or *Scarp* is a belt of extremely steep slope, usually marking the edge of the sea, one bank of a river or the sides of a gorge. A scarp may break the continuity of a plain, separating one nearly level expanse from another at a higher level. The term *escarpment* is applied to the relatively steep slope which follows the line of strike of the strata.

Mountains and *Hills* are to be distinguished by height alone, yet no definition of a hill has ever been more satisfactory than "an elevation lower than a mountain," while a mountain can only be termed "an elevation higher than a hill." It may, however, be conceded that mountains are confined to the highlands over 2,000 feet in elevation, while hills may occur also in lowlands or uplands. Mere elevation of a summit above sea-level is not enough to constitute a mountain; an eminence rising 300 feet above one of the vast level plains of Tibet can only be called a hill, although its summit may exceed 16,000 feet above the sea. A mountain system like the Alps or Andes, although forming a broad region, is easily recognised as consisting of mountain ranges. German geographers distinguish between low, middle, and high mountains, but the English language renders such a division cumbrous in use. Peaks are usually the culminating points on the crest of a mountain range, but occasionally, especially in the case of volcanoes, a great summit may rise directly from a plain. Parallel mountain ranges often enclose between them intermont basins of

considerable extent and at a high elevation, or even, as in the case of Tibet, extensive tablelands.

The *Valley* is perhaps the most varied of all land-forms. A valley may be viewed as limited by the meeting lines of slopes.[1] The meeting line of two diverging slopes is a *watershed* or water-parting or divide, and such a line marks off the valley of a river, viewed in its largest sense, from those of its neighbours. The valley, in a narrower sense, may be marked by the lines separating gentle from more abrupt slopes. The meeting place of two converging slopes is a *Thalweg*, valley-line, or stream-line, usually marking the central line of a river bed. The walls or sides of a valley may be abrupt as in a gorge or gently inclined like the imperceptible slopes bordering a great river before the commencement of its flood-plain. The whole space between the outer watersheds limiting the region draining into a single river is called the *drainage-area* of that river. Transverse valleys, better termed defiles, completely traverse a mass of high ground from the plain on one side to the plain on the other. The name of *longitudinal valleys* is given to the long hollows between two parallel mountain ranges; while the shorter valleys which furrow the sides of the mountains are called *lateral*. Two lateral valleys meeting on the crest of a range form a *col* or pass by which the range may be crossed. No geographical features are more important in determining the lines of traffic across mountainous regions than transverse and lateral valleys with their connecting passes. The head of a valley on a mountain side may take the form of a rounded recess amongst the rocks termed a *corry* or *cirque*, the cliffs surrounding which often rise extremely steeply. The lower ends of river valleys on the coast when "drowned" or submerged, form inlets of the sea of various kinds. In this way lowland valleys give rise to estuaries, firths, or bays; upland or highland valleys form inlets which are known as *rias* when the depth diminishes gradually from the mouth towards the head, and as *fjords* or sea-lochs, when a bar shallows the water at the mouth, thereby separating a considerable depth inside from the deep water outside.

In this rapid summary of the chief form-elements of the land reference has been made to their form only; but while it is the form that mainly controls the distribution of climate, vegetation, animal life and human activity on the Earth's surface, the origin of the various forms has important bearings, and often allows a more helpful method of classification to be adopted.

Materials of the Earth's Crust.—The study of the material composing the lithosphere and the changes it has undergone in the past is the special subject of the science of geology; and while we do not concern ourselves here with the methods or controversies of geologists,

[1] It might perhaps be permissible to include the *slope* as a distinct land-form, but where a gentle slope is found it may be viewed as an inclined plain; and a steep slope forms part of either a mountain, hill, scarp, or valley.

GEOLOGICAL FORMATIONS.

Quaternary.
Recent.
(Alluvium.)
Pleistocene.
(Diluvium.)

Tertiary.
Pliocene.
Miocene.
(Molasse.)
Oligocene.
Eocene.
(Flysch.)

Mesozoic.
Cretaceous.
Chalk.
Upper Greensand.
Gault.
Lower Greensand.
Wealden.
Jurassic.
Oolite.
Lias.
Triassic.
Rhætic.
Keuper.
Muschelkalk.
Bunter.

Palæozoic.
Permian.
Magnesian Limestone.
Carboniferous.
Coal Measures.
Millstone Grit.
Carboniferous Limestone.
Devonian or Old Red Sandstone.
Silurian.
Ordovician.
Cambrian.

Archæan.

some of their results are necessary in order to make geography—the description of the actual surface of the Earth—intelligible. The rocks of which the primitive crust of the Earth was composed must have been subject to the disintegrating effects of weather as soon as they were elevated above the level of the sea. The material worn off them must have accumulated on shores or on land-slopes, and in time become itself consolidated into new kinds of rock, which were elevated and worn away in their turn to give rise to fresh sediments, and so on for incalculable ages. Before the appearance of life on the globe there was no clue as to the relative age of rocks except superposition; but since that era most sedimentary formations contain distinctive fossils which enable rocks of approximately the same age to be recognised in distant places, and so make possible a fairly complete classification. The whole series of sedimentary rocks is nowhere found, but large portions of different parts occur in several places, and allow the order of the whole to be ascertained.

Order of the Rocks.—The most ancient sedimentary rocks known contain no traces of life; they are of a crystalline texture, and often foliated or crumpled in consequence of subsequent change, the process of change being termed metamorphism. The series is known as *Archæan* on account of its great antiquity; gneiss and schist are typical representatives.

The sedimentary rocks containing fossils are divided into four great groups, according to age, known as *Palæozoic* (old life) or *Primary, Mesozoic* (middle life) or *Secondary, Cainozoic* (modern life) including *Tertiary*, and *Quaternary* or *Post-Tertiary*. The physical character of the rocks does not differ so much as their varying age might lead one to expect,

but in a very general way the Primary rocks are the hardest and most durable, the Secondary are less compact, the Tertiary still more friable, and the Quaternary usually consist of incoherent sands, gravels and clays. Yet very hard rocks may occur even in the youngest formations. The great groups are subdivided into formations which consist of different sets of strata, to each of which a special name has been applied. The table on p. 51 shows the position of all the chief and some of the local formations mentioned in this volume, but it is not to be taken as representing the views of any one geologist; it attempts to generalise the facts which most geologists agree in accepting.

Primary rocks are of peculiar importance on account of their great wealth in valuable minerals. The quartz veins associated with the Cambrian and Silurian strata are rich in gold and the ores of other metals; but the Coal Measures of the Carboniferous system are economically the most important. Coal is also found in more recent rocks, but the best coal, which occurs in the great fields of western Europe, the greater fields of eastern America, and the greatest fields of all in China, is of Carboniferous age. The association of iron-ore, limestone for supplying a flux, and highly refractory sandstone suitable for lining furnaces enables the manufacture of iron usually to accompany the mining of Carboniferous coal. Generally speaking the surface forms of a country underlain by the more recent rocks are less rugged, and in temperate climates the soil is more fertile than that of ancient strata; but the type of scenery depends less on the age of the formation than on the nature of its rocks. Amongst the rock-types common to all formations which determine scenery, it is sufficient to mention *limestones* (which may be metamorphosed into *marble*), *conglomerates* and *breccias*—the pebbly or angular fragments of which are often cemented by limestone; *sandstones*, which may be fine or coarse in grain, compact or friable, and may be metamorphosed into *quartzite*; and *clays* (some soft like mud, others stiff or set with stones) which may be metamorphosed into *shale* or *slate*. Every one of these rocks produces a distinct variety of scenery, recognisable by the practised eye.

In addition to the sedimentary and metamorphic formations account must be taken of *igneous rocks*, the origin of which may range in time from the pre-Archæan period down to the present day. They are of two classes, *Plutonic* which have solidified from fusion under the pressure of other rocks in the form of masses, dykes or intrusive sheets, of which granite and some basalts are examples, and *Volcanic* which have poured out on the surface and solidified in the air or under water. Igneous rocks give great variety and character to a landscape, especially when they occur among sedimentary strata, and the features they produce are usually of great geographical significance. For instance, the old volcanic necks which

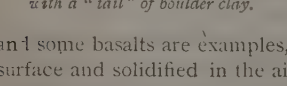

FIG. 25.—*Diagrammatic section of an old volcanic neck forming a crag, with a "tail" of boulder clay.*

project as steep rocks above the level surface of a plain furnished natural sites for ancient fortresses, and mediæval castles which ultimately formed the nucleus of modern towns.

Features due to Crustal Movements.—The crust of the Earth is subject to movements of various kinds which result in elevations or depressions of the surface as explained in Chapter IV. Where the crust is crumpled into a series of folds, mountain chains of great height are ridged up, characterised by a succession of lofty ridges separated by deep parallel (longitudinal) valleys. The arch of the folded strata is called in geological terminology an *anticline* or anticlinal fold, and the trough a *syncline*. When the amplitude of the folding is great the rocks may be thrown into very complicated convolutions, the strata being even reversed the lower over the upper, or torn apart. A good example of a folded and eroded mountain system is shown in the section across Switzerland (Fig. 130). All the lofty mountain ranges of the world, as shown in Fig. 19, are fold-mountains which were upridged in the Tertiary period, and are thus, geologically speaking, things of yesterday. Other forms of crust-folding occur, though not so strikingly; the *monoclinal fold* for instance produces a steep-sided and flat-topped elevation.

FIG. 26.—*Diagrammatic section across a range of fold-mountains before erosion has set in, showing successive anticlines and synclines.*

Mountain and valley forms of quite a different type are produced when strata subjected to severe stresses relieve the strain not by folding but by cracking, and blocks of the crust are thrust up or allowed to drop down between parallel cracks or *faults*. The raised or lowered masses may retain their original position or be tilted, and in either case they give rise to *crust-block mountains* (the *Schollengebirge* of the Germans), or to *rift-valleys* (*Graben*), such as the upper Rhine plain or the great rift-valleys of the Dead Sea, Red Sea, and East Africa (Fig. 445). These, when of relatively recent origin, are wild and rugged, giving rise to a country full of grand

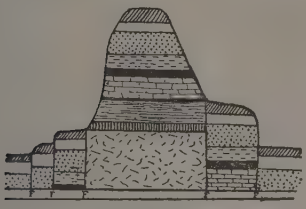

FIG. 27.—*Diagrammatic section of Crust-Block Mountain.*

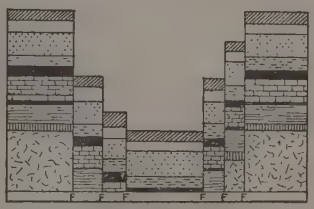

FIG. 28.—*Diagrammatic section of Rift-Valley.*

scenery but presenting great obstacles to traffic. The movement of crust-blocks separated by a great fault is still to be detected in many cases; it usually occurs in the form of slight slips accompanied by earthquake shocks. Lines of faulting are of course lines of weakness in the crust, and consequently afford a favourable opportunity for the outbreak of volcanic activity. Hence mountains of volcanic accumulation and even great plains of level lava, which originally flowed in a molten state from long fissures in the crust, are met with in the neighbourhood of rift-valleys. Typical volcanic cones sometimes remain as prominent features in the scenery long after all volcanic activity has ceased. The old craters are often occupied by lakes without inlet or outlet and sometimes very picturesquely framed in cliffs (Fig. 191). Where volcanic agency has failed to assert itself on the surface, masses of igneous rocks may be intruded amongst strata in the form of *laccoliths* thrusting up the surface into a dome (Fig. 29).

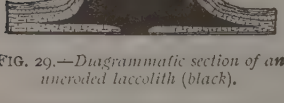

FIG. 29.—*Diagrammatic section of an uneroded laccolith* (*black*).

Features due to Erosion.—As soon as a rock-surface is exposed to the air it may be attacked by the chemical action of the water and dissolved gases, by the alternate heating and cooling due to radiation, by wind driving sand particles, by the dissolving and abrading action of running water and sliding detritus, by frost, or by the more massive action of moving ice. The result is that in every part of the world high ground is always being eroded or eaten away, and the broken material swept off to lower levels. Every different kind of rock resists the "tooth of time" in its own manner and to a particular degree. Beds of clay or loose sand are washed by rain into fantastic forms, according to the varying hardness and coherence of their parts. Limestones, no matter how hard, are dissolved by rain or rivers, giving a very distinctive type of country, caves or even underground river channels being produced, into which the surface drainage sinks by rifts and swallow-holes which have been similarly dissolved out, and the land is left dry and relatively barren. These features are so characteristic of the Karst district of the Adriatic coast that the name *karst phenomena* has been applied to them (see Fig. 156). The more compact rocks weather differently according to their texture and arrangement. Thus a coarsely crystalline granite decomposes into clay and sand along the lines of cracks, and in the process assumes the bold serrated outlines familiar to the observer in all granite mountains; but the closer grained basalt is much more durable. A dyke or sheet of igneous rock embedded in sedimentary strata stands out sharply when the softer rocks have been weathered away. Again, the forms of a region where the strata lie horizontally like the Grand Canyon district of the United States, differ from those of one where the rock sheets dip regularly in one direction. The dip-slope weathers more slowly than the steeper edge or *escarpment*, which runs along the direction of the strike (Fig. 30). This is seen best on

sea-coasts and river-valleys where the character of the cliffs carved out by the waves or current varies in accordance with the structure as well as the resisting power of the rocks. Except in the newest volcanic formations the surface of all exposed rocks has been greatly altered by weathering, and so far as their scenery is concerned the upraising of the land has served mainly to guide the ceaseless action of the tools of erosion. The result of prolonged erosion on an ancient plateau is to cut it up into detached masses of mountainous magnitude, which on account of their origin have been called relict-mountains, or mountains of circumdenudation.

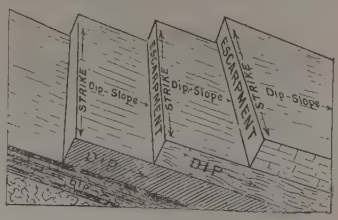

FIG. 30.—*Diagram illustrating dip, strike, dip-slope, and escarpment.*

River Work—Destructive.—As the streamlets flow down any slope to meet and form a larger stream they begin to wear a channel for themselves, which gradually cuts deeper and deeper into the ground, the sides being steadily widened by weathering as the channel is excavated, so that the lower valley of a great river becomes very wide and nearly flat. In a region where the atmosphere is dry, weathering is retarded, and the river as it cuts its way downwards leaves the rocks sharp and steep, as may be seen in the canyons of the Colorado. The steeper its bed the more rapidly does a stream erode, hence rivers are most powerful in destruction near their heads, and tend to cut back their watersheds. Thus a water-parting which was once straight may become sinuous, and in time the rivers of the steeper slope may actually tap or capture the upper waters of the adjacent drainage area, and a river system which on a new land surface is comparatively simple, becomes extremely complicated when the land has been long subjected to erosion (Fig. 36). As a river deepens its bed below the general level of the valley floor the deposits of stones and gravel which had been stranded on its margins are left at a higher elevation forming level *terraces* or *benches* (Fig. 32). All mountain ranges become seamed with lateral valleys of erosion. A new land surface is usually irregular, with hollows in which lakes are formed by water accumulating until it overflows; but as the land grows older the lakes are either filled up with sediment carried in by streams, or drained by the escaping river deepening its channel, and the old lake-bed becomes an alluvial plain. Any abrupt change of level on a new land surface, or any hard bed of

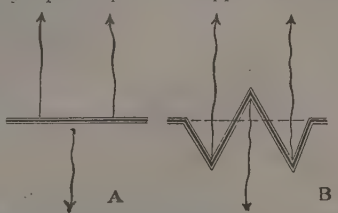

FIG. 31.—*Diagrammatic plan of a straight watershed* (A) *showing rivers extending their valleys headward* (B).

rock in the course of a mature river forms a waterfall; but in time each sharp step is cut back to form a steep slope in a gorge through which the water foams in rapids, and ultimately the river grades its course and flows uniformly along a uniform slope.

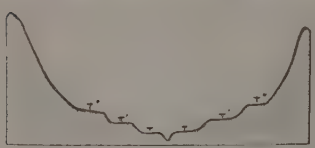

FIG. 32.—*Diagrammatic section across a River Valley showing Terraces* (T).

As a long river flows on its way it is deflected to a certain extent on account of the Earth's rotation. This was first detected by von Baer, and is included in the statement of Ferrel's Law thus :—

If a body moves in any direction on the Earth's surface, there is a deflecting force arising from the Earth's rotation which tends to deflect it to the right in the northern hemisphere, but to the left in the southern hemisphere.

The rivers of the northern hemisphere always pressing more heavily against their right bank, cut it back as a cliff, while the left bank is left low and flat, being composed of alluvium deposited by the stream. This is strikingly illustrated in the great rivers of Russia and Siberia, where the "high bank" and "low bank" sides of the stream are terms used where we speak of the right bank or the left. It should be remembered that the right bank of a river is that on the right hand of a person looking downstream.

River Work—Constructive.—As a river approaches its mouth the gradient of its bed diminishes, the water flows more slowly, and is no longer able to sweep along the load of stones and gravel, which are accordingly dropped near the sides, to be swept forward spasmodically by floods. Eventually even the sand and mud subside upon the flood plain across which the river meanders in constantly changing loops. At the mouth the final detritus may be swept away and dispersed along the shore by tidal or other currents, or if the river enters a gradually deepening and widening inlet of the coast, the to-and-fro tides may distribute the sand and mud in banks or bars, as in the Thames or Tay, or spread it over so great an expanse as to produce no obstruction, as in the Firth of Forth. But all great rivers which enter a lake and many which enter the sea deposit their sediment in the form of a delta, which grows gradually seaward, and the water crosses it in many and variable channels (Figs. 362 and 441). The margin is often lined with lagoons separated from the sea by bars of mud; but the delta itself is a flat expanse of very fine soil. The effect of floods in rivers flowing over a nearly flat plain is to cause a deposit of alluvium along the sides of the stream, and a consequent silting-up of the bed, which results in the river flowing at last along an embankment above the general level of the plain and sloping gently on both sides down from the river. When a flood occurs the banks are apt to burst, and the river descends upon the low ground with tremendous force, often forming a new channel for itself to the sea.

This frequently happens on a small scale in the lower Mississippi, and to a far greater degree in the Hwang-ho (Fig. 264). The flood-plains and deltas of great rivers in latitudes which ensure a genial climate are the most fertile lands in the world, and have been the cradles of all the great nations of the ancient East—Assyria, Egypt, China, and India.

When a stream from a mountain valley flows out on to a plain, or a flat-floored longitudinal valley, the sudden change of slope causes the deposition of the detritus it carries down in the form of a *fan* of alluvial soil, over which the stream usually flows in several branches. The alluvial fan is a form of accumulation intermediate between the delta laid down in still water and the *scree* or *talus* of detached rock fragments which grows, sometimes as a magnificent sweep of boulders, at the base of a line of cliffs. In arid regions this work of rivers is very characteristic on account of the absence of rain which in other regions washes away and rearranges the alluvium.

FIG. 33.—*The Alluvial Fan of the Ill opposite Leuk in the Rhone valley. Contours at every* 100 *feet.*

Accumulations due to Wind and Ice.—Wind is powerful in shifting and rearranging dry surface deposits. Hence, in all arid or desert regions there are vast stretches of sand heaped up by the wind into *dunes* or hills, sometimes several hundred feet in height, sloping gradually on the side towards the prevailing wind and falling steeply on the sheltered side. Dunes, unlike all other geographical features of the land, move like waves, preserving their size and form, but gradually invading and destroying the fertile margins of the desert. Even in moist climates small dunes are formed on sandy shores, and must be fixed in order to protect the neighbouring land, by planting grasses or trees with spreading roots upon them. The finer dust blown off from deposits of clay or very minute sand is believed to be the origin of the peculiar earthy deposit known as *loess*, which occurs on the borders of the Alps, in the Mississippi valley, and to a remarkable extent in northern China, where it completely conceals all other formations. Another accumulation common in tropical countries is a stiff red clay called *laterite*, the result of the weathering of igneous rocks. A fourth and very important accumulation is the *boulder clay* or *diluvium* left by ice sheets or in extra-glacial lakes. Large tracts of the low ground of northern Europe (Fig. 52) and America (Fig. 329) are covered with this clay, which has had the effect of greatly changing the surface, causing the formation of innumerable lakes and associated river systems which have not yet had time to drain the basins or to entrench themselves deeply in the land.

The Geographical Cycle.—Professor W. M. Davis has formulated the geographical results of erosion and crustal movement in a theory

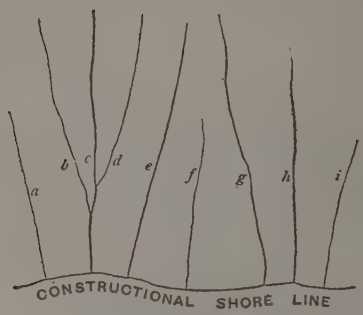

FIG. 34.—*Cycle of Eroston. I.*

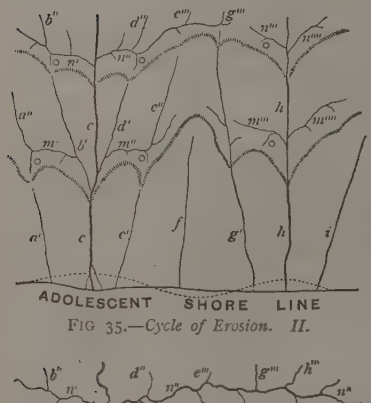

FIG 35.—*Cycle of Erosion. II.*

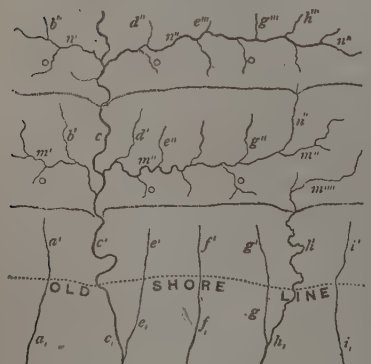

FIG 36.—*Cycle of Erosion. III.*

which explains the progressive development of a land surface. The time which is required for a land surface to be worn down low and flat by the action of erosion he terms a *cycle.* The low flat surface which is the final result of erosion is termed a *peneplain.* It is only possible here to consider a special case which illustrates the general application of the theory. Thus Professor Davis imagines a varied mountainous region gradually sinking, and the sea converting the submerged valleys into rias, while the rivers are shortened until the upper tributaries reach the sea as independent streams. Meanwhile the mountains are being reduced by erosion and the sea-margin built up by deposition, until, in the course of long ages, the mountains are worn down and the shore silted up to form a nearly flat expanse.

If now a period of elevation follows, and the uplift is greatest in the region of the old mountains, the sea-bed will be raised into a new land of stratified rocks having a gentle seaward dip down which the new rivers will find their way, guided by the slight inequalities of the surface. The new rivers formed in consequence of the slope of the land are termed *consequent* streams (Fig. 34, *a* to *i*). If, after a time, the uplift ceases, these rivers will continue to cut their channels down, and entrench themselves in valleys which will be enlarged by erosion, and at the same time cut down to a slope of equilibrium in which the waste of the valley floor is balanced by the deposit of sediment. As the original or conse-

quent valleys are deepened, the opportunity is afforded for streams flowing in on the side to erode for themselves valleys which may be termed *subsequent*. While consequent rivers flow down the dip slope of the strata subsequent rivers run at right angles, along the strike (Fig. 35, *m*, *n*); they naturally are formed along the weaker or softer strata. As the valleys of subsequent rivers grow headward along the guiding line of the strike, they may tap and capture the upper courses of other consequent rivers which have had a gentler slope than that of their more powerful neighbour to which the capturing streams are tributary. Finally a new set of small streams is called into existence, flowing down the steep face of the escarpment to the subsequent river, and these Professor Davis terms *obsequent* (Fig. 35, *o*). The result of all this river-action is to cut up the uniform slope of the new land into a series of inland sloping escarpments corresponding in number to the harder strata and trenched by the valleys of the sea-ward flowing rivers. After long ages the valleys will be so widened, and the intermediate elevations so much reduced, that the whole surface assumes the old-age form of the peneplain; and across it the ancient rivers will meander in winding courses, with no gradient sufficient to enable them to work (Fig. 36). Projecting masses of hard rock which remain projecting above the peneplain are termed *monadnocks* from Mount Monadnock in New England, a representative instance.

If at this stage a fresh uplift of the land should occur, a new coastal plain will be formed, the old consequent rivers will be quickened by the increased slope of their beds, and commence to incise their valleys anew, and as the deepening goes on the subsequent and obsequent streams will also be revivified in their turn, and a more complete adjustment of river to land obtained in the second cycle than was possible in the first.

The theory of a geographical cycle is illustrated here by a single case in a very simple form—so simple that it probably corresponds with the evolution of no actual land surface. In nature innumerable irregularities occur; the varying arrangement and hardness of the rocks produce a great variety of forms, and the alternate elevations and depressions of the land before the work of any one stage of a cycle has had time to be completed, makes it difficult always to recognise what has really taken place. It must also be remembered that processes of faulting, tilting, warping, and folding are often simultaneously at work, so that few large areas of the Earth's surface owe their geographical forms to any one process. Still rivers always tend to adjust themselves to the land over which they flow, and so carve and mould it into definite and characteristic forms.

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CHAPTER VI.—THE OCEANS

By Sir John Murray, K.C.B., F.R.S., and Hugh Robert Mill, D.Sc

The Hydrosphere.—In the atmosphere the region with which we are most familiar is the lower surface in contact with the land or sea; the higher air requires study—from the geographer's point of view—only in order to find the causes of the movements in the lower. But in the hydrosphere it is the upper surface which plays the most important part in human affairs, while the depths of the ocean have only to be studied in order to explain the superficial movements and actions. Lakes, rivers, the interstitial water of the lithosphere, and the water vapour of the atmosphere may all be regarded as extensions of the hydrosphere. The general form of the ocean basins is a vast depressed plain, yet the floor of each ocean is diversified by ridges and troughs, the deepest parts frequently occurring not in the centre of the oceans, but comparatively near shore. The configuration of the ocean floor is of great practical importance for laying telegraph cables; but it is not necessary to describe it in detail here. The greatest depth hitherto reported in the ocean is, 5,269 fathoms (or six miles) to the east of the Ladrones in the North Pacific. In the south-west Pacific to the east of the Kermadec Islands soundings of 5,155 fathoms and 5,147 fathoms were obtained. These are the only records of depths exceeding 5,000 fathoms, though soundings in depths between 4,000 and 5,000 fathoms are comparatively numerous. The greatest depth known in the Atlantic is 4,660 fathoms, to the north of the West Indies, while in the Indian Ocean no depth approaching 4,000 fathoms has hitherto been found, the deepest sounding being little over 3,200 fathoms. It is worthy of remark that Sir James Clark Ross ran out

Fig. 37.—*Configuration of the Bed of the Atlantic Ocean, showing contour lines of* 100 *fathoms (dotted),* 1,000, 2,000 *and* 3,000 *fathoms of depth. All over* 3,000 *fathoms is in solid black.*

,000 fathoms of line in the Southern Ocean, to the south of South Georgia, ut in 1904 Dr. Bruce found the depth at this spot to be only 2,660 fathoms. he floor of the ocean on the whole lies about 2½ miles below the average evel of the continental land surface (see Fig. 24).

Land and Sea.—The margin of the hydrosphere where it touches the rotuberant parts of the lithosphere is the primary dividing line of the Earth for most human purposes, separating the water from the land. The xact areas of the oceans and the land cannot be ascertained until the rctic and Antarctic regions have been fully explored, but for the known arts of the Earth the proportion of sea to land is about 2·5 to 1, or in other vords 72 per cent. of the surface is sea, and 28 per cent. land. The whole urface of the Earth measures approximately 148,570,000 square sea-miles, r 196,940,000 square miles; the hydrosphere may be taken as covering bout 142,000,000 square miles, and the land about 55,000,000.

Superficial Divisions of the Hydrosphere.—The surface of the ydrosphere is most clearly marked off by land into separate portions in he northern hemisphere, the larger of these being called oceans, while the maller are called seas. Seas have been classified in various ways; the implest classification takes account of (1) *Inland Seas* which are entirely urrounded by land; the Caspian is the only example, the smaller bodies f inland water being called lakes; (2) *Enclosed Seas*, which are almost urrounded by land, but joined to an ocean by one relatively narrow hannel, *e.g.*, the Mediterranean or the Red Sea; and (3) *Partially Enclosed Seas*, which are connected with the ocean by two or more openings, being ften marked off from it by a chain of islands, *e.g.*, the North Sea or Japan Sea. Partially enclosed seas may be farther divided into shallow and leep, the latter being sometimes separated from the ocean by a barrier vhich may not quite rise to the surface, as in the case of the Norwegian Sea in the North Atlantic Ocean. Groups of seas "partially enclosed" by sland loops along the coast of a continent, as for example on the east coast of Asia, are sometimes called fringing seas.

The early Greek conception of an insular land surrounded by the river Oceanus (Fig. 3) gave its name to the *ocean*, or, as it was called in the time of Columbus, the "Ocean Sea," but the name is now applied to the portions of the hydrosphere separated by the continents. These are the *Atlantic*, between Europe-Africa and America, the *Pacific* between America and Asia-Australia, and the *Indian* between Asia-Australia and Africa. Each of hese oceans may be divided into a northern and southern part by the equator. The southern boundary of the three oceans, according to the ule generally adopted, is the Antarctic Circle, within which lies the Antarctic Ocean; but for many purposes it is more convenient to take the parallel of 40° S. as the dividing line, and call the great ring of shoreless vater to the south the *Southern Ocean*, the term Antarctic being appro-priately enough applied to its southern edge. The northern limits of the Atlantic and Pacific are usually drawn at the Arctic Circle, and the water

surrounding the north pole is called the Arctic Ocean, but there are reasons for considering the whole Arctic basin to belong to the Atlantic Ocean, of which it forms the Arctic Sea.

Islands.—Two distinct and contrasted types of island are readily recognised. (1) *Continental Islands* which do not as a rule lie far from continental shores, and usually consist of crystalline and sedimentary rocks similar to those found on the neighbouring mainland, from which they are usually separated by shallow seas. In fact such islands generally rise on the continental shelf, and in many cases have been separated from the continent at a period geologically recent. Examples of these are the British Islands, only separated from the mainland in Quaternary times, Sicily, Japan, the Malay and Greek archipelagoes, and the close island fringes of fjord-riven coasts. Madagascar, New Zealand and New Caledonia are examples of a somewhat different class of continental island, being separated from their nearest mainland by a considerable distance of deep water. Continental islands as a rule show a community of flora and fauna with the neighbouring land. (2) The second class consists of *Oceanic Islands* which are situated far from any continent, the islands, singly or in groups, forming the peaks of submarine mountains which rise from the great depths of the ocean, like St. Helena or the Fiji Islands. Oceanic islands do not as a rule contain any of the typical rocks of continents, *i.e.*, sedimentary strata, metamorphic rocks, or such acid rocks as granite. They are either volcanic, forming the cones or craters of active or recently extinct volcanoes, in which case they may be mountainous and of considerable height (see Fig. 326), or else they are of organic growth, usually mainly composed of coral, and then they are typically low and flat, unless they have been upheaved. Reef-building corals and other lime-secreting organisms, which make up coral islands, flourish best in pure sea water where the temperature never falls below 70° F., and where the annual range of temperature does not exceed 12° F. Hence coral formations are practically limited to the warmer tropical seas. They are of several kinds, the simplest being the *fringing reef*, a mere edge of growing coral in the shallow water below low-tide mark. The *barrier reef* is found farther out, and is separated from the shore, to which it runs more or less parallel, by a stretch of shallow water where detached masses of coral often rise to the surface. The greatest reef of this kind lies off northern Queensland, forming a sheltered channel for steamers along the coast (see Fig. 294). Many of the volcanic islands of the Pacific are almost completely surrounded by a barrier reef. The *atoll* is the most characteristic form of coral land. It consists of a narrow reef enclosing a shallow lagoon with no central island (see Fig. 326). Coral islands are raised above the level of the sea either by upheavel or by waves breaking off and piling up masses of the coral. Two theories are advanced to account for the origin of atolls and barrier reefs, each of which demands a solid foundation coming to within 20 fathoms of the surface. The theory of Charles Darwin requires that the

foundation is undergoing slow subsidence ; that of Sir John Murray is equally applicable to a stationary, sinking or rising region. As a matter of fact many instances are known of atolls having been elevated high above sea-level after their formation was completed. Oceanic islands have all a restricted and highly individual flora and fauna as a result of their remoteness from continental land.

Near shore or in fresh water various minor classes of islands may appear, due to deltaic formations, or to the division of a river into branches which afterwards reunite. These islands, and indeed continental islands in general, are to be viewed as forming part of the continental area of the Earth, the separation being frequently only a temporary stage in the evolution of the land.

Sea-Water.—The vapour which is always rising from the surface of the sea is condensed by contact with elevated land, or on account of some atmospheric change, and precipitated as fresh water (rain or snow) over the surface of land or sea. The water flowing over or through the land dissolves part of the substance of the rocks, the most soluble matters like common salt and the sulphates of magnesia and lime, being taken up in largest proportion, but also carbonate of lime (the solution of which is promoted by the dissolved carbonic acid absorbed from the air and soil) and silica. These materials collect in the basins of internal drainage into which the rivers from one-quarter of the land-surface flow, and there give rise to salt lakes ; but as the rivers draining three-quarters of the land reach the sea the ocean has become a vast depository of all soluble salts, and hence its water tastes both salt and bitter. The Atlantic is pre-eminently the ocean of land-drainage ; including the Arctic basin, fully one-half of the land-surface slopes towards and drains into it. The Pacific and Indian oceans receive comparatively few rivers.

Although sea-salt is practically identical in composition in all parts of the ocean the amount dissolved in the water varies from place to place, the proportion being of course greater in regions where there is great evaporation and little or no rainfall, such as the Red Sea, or the trade-wind belts of the tropics, and less where there is a heavy precipitation such as the region of the equatorial calms. The salinity is also much lowered in estuaries off the mouths of large rivers, and in places where icebergs are melting. The fact that the water of the sea is salt and not fresh has an important influence on the action of heat. If a column of sea water of uniform salinity throughout is cooled from above it steadily grows denser, and the surface layers sink and in this way distribute the low temperature by convection throughout the mass. Thus the whole of a detached portion of sea water assumes rapidly the temperature of the coldest season of the year. If the cold is very severe, when the freezing point (28° F. for sea water of normal salinity) is reached the mass should freeze solid. This, however, never takes place, because the water of the ocean is never at rest, and chemical changes occur in

the freezing of sea water which lower the freezing-point of the portion remaining liquid. It usually happens that the surface water is less saline, and consequently so much lighter than the deeper layers that in spite of its lowered temperature it remains floating on the surface until it freezes. When a column of sea water of uniform salinity is heated from above, the surface water evaporates and the remaining liquid near the surface gains more in density by concentration than it loses by expansion, and thus sinks and raises the temperature of the whole, a result that could never occur with fresh water. But it is only in places like the Red Sea, where the superficial layer is not freshened by rain or rivers, that this effect is commonly produced. The specific heat of sea water is a little less than that of fresh water, so that the amount of heat which would raise a quantity of fresh water 9·35° F. in temperature, would raise the same quantity of sea water 10°. Sea water is also a better conductor of heat, so that it is affected by the Sun's rays to a greater depth than fresh water. The equilibrium of the water of the ocean may thus be destroyed in many ways, and hence it is more readily set in circulation than fresh water, and the causes of its movements are more difficult to ascertain. Sea water also contains in solution a quantity of the various atmospheric gases which bears a definite relation to the temperature at which they were absorbed.

FIG. 38.—*The salinity of the surface water of the Atlantic Ocean, showing by the density the regions of great evaporation and concentration in the Red Sea, Mediterranean Sea, and Trade-wind areas, and the regions of dilution due to rivers, to rain in the equatorial belt and to melting ice in the far north and south.*

Oceanic Deposits.—The chemical action exerted by the complex solution of salts and gases found in sea water produces many interesting effects both as regards the action of living organisms in secreting the material for their shells and skeletons, and the changes brought about in the deposits forming on the bottom. For a distance from land varying with the set of ocean currents and prevailing winds, but rarely exceeding 300 miles, material derived from the shore makes up the larger part of the deposits on the sea-bed at all depths and these are consequently termed *Terrigenous*. Outside this limit the deposits are termed *Pelagic*, as they are formed in the free ocean beyond the influence of land except by the occasional fall of dust and the drifting of volcanic pumice

In temperate and tropical seas far from land the deposit, where the depth is comparatively slight, consists chiefly of the dead calcareous shells of the minute organisms which swarm in the surface water. The most wide-spread of these deposits is *Globigerina Ooze*. But when the depth is great the lime of those shells is nearly or completely dissolved out when they are falling through the vast mass of water or lying on the bottom, and there is left only a *Red Clay* composed of clayey matter mixed with meteoric and volcanic dust. It is by the occurrence of these pelagic deposits that the theory of the permanence of ocean basins is largely supported. In the fresher and colder water of the polar seas siliceous organisms predominate and their remains give rise to the *Diatom Ooze* so characteristic of the Southern Ocean where it approaches the Antarctic Circle.

Tides.—It is only in the great ring of the Southern Ocean and in the vast expanse of the Pacific that the tide-raising powers of the Sun and Moon can produce their full effect. The ocean tides show a rise of the water-level by a foot or two when the crest of the semi-diurnal tidal wave passes the place of observation, and a fall of a foot or two when the trough passes six and a half hours later. On entering shallow water the tidal wave becomes changed into a current, often of considerable strength. Such currents may also be produced by shoals in the open sea, but they find their fullest development along flat shores where the submergence and uncovering of the beach is often a very impressive sight. The tidal currents sweeping through the rocky channels between islands often give rise to dangerous eddies and whirlpools, and may render the channels useless for navigation during the strength of the tide. On the other hand, the influx of the flood tide in the lower courses of the rivers of a flat country often enables shipping to reach ports which would otherwise be inaccessible. The greatest rise and fall of the water produced by the tide occurs in long funnel-shaped bays or estuaries, the difference between high and low water at spring tide at the head of the Bay of Fundy being as much as seventy feet; but the average tidal rise and fall round the coasts of most countries does not exceed ten feet. The subject of the tides, the times of their occurrence, and their height is of a most complex character owing to the interference of various wave-systems; but on the whole, tidal influence is not one of the main factors in the circulation of the oceans.

Temperature of Ocean Surface Water.—The mean daily range in temperature of the surface water of the ocean is not more than 1° F., while that of the air resting upon it is three times as great. The contrast of the ocean surface with the land as regards temperature is thus complete. Between the polar regions where the surface of the sea is freezing, and the Red Sea and Persian Gulf where the temperature of the water often exceeds 90°, there is an extreme range of 70°. The extreme annual range in any one part of the ocean surface does not

exceed 53° and this only occurs off the coasts of Newfoundland and of Japan, where the same area is occupied at one season by cold water coming from the Arctic regions and at another by warm water from the tropics, and it is not a measure of heating and cooling in the same water. Viewed broadly the hydrosphere is divided into five zones of temperature arranged roughly parallel to one another, but more distinct on the western than on the eastern sides of the oceans. These are a *Circumtropical zone* of high temperature (over 80°) and small annual range, two *Circumpolar zones* of low temperature (under 50°) and small annual range, and between these and the hot zone two *Intermediate zones* which show a great annual range of temperature produced by the mingling of the waters of the two others The hot belt is due to the intensity of solar radiation, and it is important because all coral islands occur within it. The cold belt of small range is produced by the low polar winter temperatures and the melting of ice in the summer.

Temperature of the Deep Water.—In the open ocean at the depth of 50 fathoms it is probable that the temperature does not change by so much as 2° F. at any one place throughout the year; and below the depth of 100 fathoms there is no evidence of any annual change of temperature whatever. But differences between the temperature of one part of the ocean and another may be as great as 42° at 100 fathoms, 20° at 500, and 8° at 1,500 fathoms. Everywhere in the open ocean, but especially in the tropics, the temperature diminishes rapidly from the surface to about 400 fathoms, and then very gradually to the bottom, where the temperature of the water is quite independent of latitude. At the greatest depths the temperature varies from 32° to 35°, even at the equator. The average temperature of the whole mass of the ocean is probably between 38° and 39°, and it may be looked upon as a body of cold water covered with a thin warm layer in the tropics. In the north-western parts of the Atlantic and Pacific the warm water extends to a much greater depth than in the tropics, and it is thinnest of all in the south-eastern parts of the three oceans.

Circulation of Enclosed Seas.—The whole mass of water in the ocean is believed to be in continual though very slow motion, because there is no abrupt change of temperature anywhere between masses of water at the same depth and not separated by a ridge. But in enclosed seas, which are cut off from the ocean by a barrier, the temperature corresponds to that of the ocean only from the surface to the depth of the barrier; below that the water retains the same temperature unchanged to the bottom. Thus the Mediterranean has a uniform temperature of 55° from 190 fathoms, the depth of the Strait of Gibraltar, to the bottom in 2,400 fathoms (the Atlantic has a temperature of 35° at the latter depth); and the Red Sea has a temperature of 70° from 200 fathoms, the depth of the Strait of Bab-el-Mandeb, to the bottom in 1,200 fathoms. Enclosed seas are not as a rule stagnant, but

their waters circulate on account of their differences in salinity. Thus the water of the Red Sea and the Mediterranean is much salter and denser than that of the ocean, so that when the level of the enclosed sea is reduced by evaporation the comparatively light ocean water flows in as a surface current, while the dense warm water sets outwards as a return current along the bottom. In the shallow Baltic and the deep Black Sea, on the contrary, the numerous rivers which flow in make the water so fresh that it overflows as a surface current, while the dense ocean-water flows in as an under-current. The Baltic is, however, very variable in its circulation on account of the action of wind, and the Black Sea is so deep that its lower waters are absolutely stagnant and putrid, unfit for the support of animal life of any kind. In shallow partially-enclosed seas, such as the North Sea, tidal currents play a notable part in the circulation of the water.

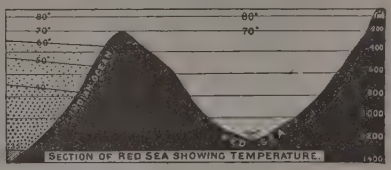

FIG 39.—*Diagram showing temperature of Red Sea.*

Action of Wind on Water.—When wind strikes the surface of water, part of the surface is depressed and the neighbouring portions ridged up; but, the force of gravity tending to restore the level surface, a wave form is generated which sweeps over the surface of the sea as a line of rollers. It is only the form that advances as in the tidal wave, the actual particles of water simply rise and fall, but the elasticity of the water keeps up the movement after the wind which generated it has died away; in fact the surface of the ocean is never quite at rest. The largest waves raised by wind have a length from crest to crest of about one quarter of a mile and a height from hollow to crest of 50 feet, but waves of this magnitude are rare. On entering a shallow, the lower portion of the water in contact with the bottom is retarded, and the upper part toppling over falls in spray as a breaker. On shores facing the steady prevailing winds the thunder of the breakers on the beach is unceasing throughout the year, and in many such places it is almost impossible to land. The power of waves to erode the coast is considerable, but rapidly diminishes with depth, so that at 100 fathoms the largest ocean waves cannot do more than stir the finest mud on the bottom. The wind acts also in another way. A fresh breeze or a gale blows off the crests of the waves in spray which is driven before the wind; a gentle breeze suffices to cause a thin stratum of the surface layer of water to slip before it, so that if the wind continues long enough from a definite quarter the surface water begins to drift in the same direction. But since the driving of surface water from one position tends to lower the level and the heaping up at another place tends to raise it, the hydrostatic equilibrium is destroyed and has to be restored by vertical movements, reaction currents, and upwelling on the windward shores. The wind

thus gives rise not only to horizontal but to vertical movements in the sea, and these vertical movements are strengthened when assisted by the slopes of a shore. An on-shore wind (that is a wind from the sea towards the land), when long continued heaps up warm surface water against the shore which displaces the cold water to a considerable depth. On the other hand an off-shore wind causes an upwelling of deep and cold ocean water against the land.

Circulation of the Oceans.—The energy of the Sun, which acts directly by effecting changes of temperature, indirectly by evaporation and precipitation, producing changes of density, and by giving rise to the whole system of the winds, is the main cause of the circulation of the oceans. It is unnecessary to inquire which of the direct or indirect solar actions is the most potent factor, since all work together and reinforce each other. It must be remembered too that the rotation of the Earth, which exercises a directive influence on rivers and wind, has a precisely similar influence on the moving waters of the sea, causing a deviation towards the right in the northern hemisphere. While the mass-movements of the ocean, mainly due to vertical circulation, are as a rule very slow and only to be deduced from indirect observations, the movements of the surface water in a horizontal sense are rapid and easily observed. They may be roughly divided into drifts and currents. A *drift* is the general movement of the surface water in obedience to the wind ; it is, as a rule, of little depth, slow and uncertain in velocity and direction, stopping when the wind stops, changing when it changes, but in the regions of steady winds producing a great effect. A *current* is a more definite movement, sometimes a sharply defined body of water flowing like a river between the relatively motionless water on either side, at a velocity of several miles an hour, and capable of persisting in its direction even against a temporary change of wind. A great ocean current is however not by any means homogeneous. It consists of strands or threads of water moving with different velocities and often varying in direction. It may contain eddies or still patches and it may extend to a variable depth. This character makes it possible for two equal currents to meet, coming from opposite directions, and yet not neutralise one another, the strands of moving water may slip past each other, or one current may pass underneath, or even cut through the other. The transition between currents and drifts is gradual, and the circulation of the ocean is to be looked on as the final result of a variety of movements which may not at any one time exhibit their typical character.

Speaking very generally the three oceans north of the equator exhibit a surface circulation as if the whole water had been stirred and set in motion in the direction of the hands of a watch ; but in the Indian Ocean the change of the monsoons reverses this circulation during half the year. The three oceans south of the equator show a similar but less complete circulation in the opposite direction, as is explained by Ferrel's law (p. 56) ; and in the centre of each of the great whirls there is an area of rest in

hich floating weed accumulates, best exemplified by the "Sargasso ea" of the North Atlantic (Fig. 40).

Currents of the Atlantic Ocean.—The trade winds blowing from ie coast of Africa drive before them two currents, the north and the south quatorial, which are separated by the equatorial counter current running i the opposite direction along the equatorial calm belt from the American oast into the Gulf of Guinea. Part of the north equatorial current enters ie Caribbean Sea, but the greater portion of it, turning northward as it ows, sweeps outside of the chain of the West Indies and reinforces the ulf Stream. The Gulf Stream leaves the Gulf of Mexico through Florida trait as a river of very salt water at a temperature of 81° on the surface, fty miles wide and 350 fathoms deep. : flows along the Florida coast at a elocity of five miles an hour, but off ape Hatteras curves towards the east, id spreads out in a fan shape, growing ooler as it flows, until it merges in a road drift that sends branches north- ards along the coast of Norway and ito the Arctic Sea, while the main ody, turning east and south, passes the ritish Islands and returns southwards o join the north equatorial current off ie Canaries. Cold currents from the rctic Sea carry many icebergs along ie east coasts of Greenland and of abrador until they melt in the warm ater of the Gulf Stream. The Lab- ador current passes southward between ie North American coast and the Gulf tream, and is known as the Cold Wall. he position of both currents changes ccording to the season. The meeting f the warm and cold water is also the

FIG. 40. — *The Currents of the Atlantic Ocean, showing the typical circulation of water in an ocean, and the relation of the Sargasso Sea to the Gulf Stream.*

ause of the dense fogs characteristic of the Grand Banks of Newfound- nd. On account of the large quantity of warm water driven against orth-western Europe, the temperature of 40° is found to as great a depth s 900 fathoms off the coast of the British Islands, while in the tropics, here the hot surface water is driven away by the trade winds, water of qual warmth is rarely met with so deep as 300 fathoms. The mass of arm water banked up against the coast of Europe accounts for the excep- onal mildness of the south-westerly winds which prevail there.

The south equatorial current is largely supplied from the cool Ben- uela current which wells up from deep water off the south-west coast Africa, and partly, it would appear, by currents drawn in from the

Southern Ocean. It sweeps across to the coast of Brazil, where part turns northward to reinforce the north equatorial current, and the rest flows southward along the coast of Brazil, turning gradually to the east as it comes within reach of the westerly winds.

Currents of the Pacific Ocean.—The circulation of the North Pacific is exactly like that of the North Atlantic but on a larger scale. The *Kuro-Shiwo* or Black Stream of Japan corresponding to the Gulf Stream, the drift of its warm water gives rise to a strong climatic resemblance between north-western Europe and north-western America, while the cold current from Bering Sea helps to complete the analogy of the cold climate of Kamchatka with that of Labrador. In the South Pacific the Humboldt current which flows northward along the west coast of South America is, like the Benguela current of West Africa, largely reinforced by the upwelling of cold water produced by an off-shore wind, which gives to the Galapagos Islands the coolest equatorial climate in the world.

Currents in the Indian Ocean.—The South Indian Ocean closely resembles in its circulation the South Atlantic and South Pacific. There is the same upwelling of cold water along the west coast of Australia that is observed off the west coasts of South Africa and of South America. The south equatorial current turns southward off the coast of Madagascar in several branches which are carried back to the east by the "brave west winds." A warm current flowing through the Mozambique Channel strikes the Agulhas Bank off the south point of Africa, where the bulk of the current is turned back to the east, while a portion continues round the Cape into the Atlantic. The strength of this current on the shallow bank produces one of the roughest seas in the world. When the north-east monsoon is blowing the currents of the North Indian Ocean circulate like those of the North Atlantic; but this direction is reversed during the south-west monsoon.

Currents of the Southern Ocean.—The continuous water ring of the Southern Ocean swept by the "brave west winds" from west to east receives branches of the south-flowing currents along the east coast of each of the southern continents, and throws off northwards branches to reinforce the north-flowing currents along the west coast of each. Antarctic drift ice may occasionally be seen almost at the northern limit of this ocean, although it rarely comes into lower latitudes than 43° or 42°. About 50° S. the warm salt surface water coming from the north is cooled and freshened by mixing with the cold fresh surface water coming from the south, and the increase of density due to the fall of temperature in the one and the increase of salinity in the other, cause a vertical sinking of surface water all round the world. The deep layers of water seem then to be slowly drawn northwards and southwards from this ring to replace the surface drifts, and thus the Southern Ocean acts as a sort of "clearing house" of the hydrosphere, where all inequalities and irregularities in the water of the separate oceans are corrected.

Functions of the Ocean.—In the physical economy of the Earth

e hydrosphere plays the part of a regulator. Its smooth surface gives an portunity for the normal system of winds to be developed over the eater part of the globe. Its thermal action carries the surplus heat of e tropics to regions less favoured by the Sun, and cools the air of low itudes by the application of deep upwellings from the cold depths, d by ice-chilled currents from the polar seas. By the absorption and storation of atmospheric gases it keeps up the uniform composition of e air. It is the one great reservoir of water-vapour determining the nfall of the land, and is thus the ultimate source as well as the ultimate stination of all rivers. It is the place where the worn-out materials of e land are fashioned anew to build the rock stuffs of the future.

With regard to the plants and animals of the land the ocean is an exorable barrier, and so it is for savage man. But the separation of e sea does not hold good for civilised humanity; the barrier has en converted into a highway, so that countries separated by five thousand les of sea are now for all practical purposes nearer than if they were ited by five thousand miles of continuous land. The fullest use of the ean as a highway demands not only considerations of the shortest line t of the most favourable conditions. Thus the quickest sailing voyage om England to New Zealand is round the Cape of Good Hope, but the ickest sailing voyage from New Zealand to England is round Cape Horn account of the prevailing winds and currents. Again, the shortest urse from Cape Town to Melbourne cannot be taken by vessels because would bring them too far south, into the region rendered dangerous Antarctic ice.

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CHAPTER VII.—THE ATMOSPHERE AND CLIMATE

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Definition of Climate.—In every known part of the Earth's surface atmospheric changes are constantly going on, from day to day, from month to month, and from season to season, which are found always to keep within certain more or less definite limits, and always in the long run to maintain a certain average condition which varies so slowly that no appreciable change can be detected unless we go back to the geological past. To every place, therefore, can be assigned a certain mean atmospheric condition, and limits may be stated beyond which this mean is not departed from—the expression of this mean condition and its limits is called the *Climate* of the place. A description of climate is an account of the physical state of the atmosphere; the different physical elements become *Elements of Climate*, and climates may be analysed and classified according to the temperature, humidity, movement, &c., of the atmosphere. In the first instance, a rough classification can be based on evidence received directly from the senses, as into hot or cold, dry or damp climates, but for exact purposes comparable observations must be made by means of instruments.

Temperature.—So far as our knowledge goes, the interior of the Earth, although undoubtedly at a high temperature, contributes a negligible quantity of heat to the atmosphere, and the heat which raises the temperature of the air above that of interplanetary space is wholly derived from the Sun. The foundations of meteorology and climatology are therefore to be sought in physical astronomy.

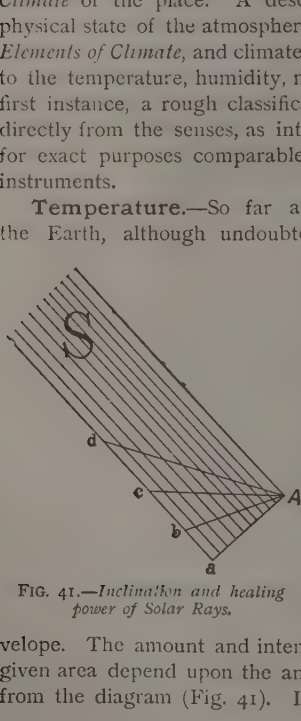


Fig. 41.—*Inclination and heating power of Solar Rays.*

Distribution of Solar Heat.—The simplest case to consider is the distribution of temperature to be expected on the surface of a globe of the same size and shape as the Earth, rotating under the same astronomical conditions, but presenting to the Sun a uniform land surface without any atmospheric envelope. The amount and intensity of the solar radiations falling upon a given area depend upon the angle at which they are received, as appears from the diagram (Fig. 41). Let S represent a bundle of parallel rays

en Aa, Ab, Ac, Ad each receive the same total number, but Aa erpendicular to the rays) is demonstrably shorter than Ab, Ab than c, Ac than Ad, and so on; that is, the greater the altitude of the n the greater is the intensity of the radiation received on a unit of rface. Speaking generally, the altitude of the Sun is greatest at the uator, and diminishes as the latitude increases, so that if the Sun mained always vertically over the equator (its position at the equinoxes) e amount of light and heat received at any place on the Earth's surface ould be a simple function of the latitude, the length of day and night ing everywhere equal. But the Sun travels over a belt extending to ½° on each side of the equator, so this simple relation is only approxiately true for a few days in the year about the time of the equinoxes. ithin the tropics the altitude of the Sun varies comparatively little, and eyond them it changes more and more according to the position of the arth in its orbit.

This consideration introices two fundamental ideas, at of *Diurnal* changes due the Earth's rotation on its is, and that of *Seasonal* anges due to its revolution und the Sun; and also to e fact that near the equator e diurnal influence is paraount and the seasonal inence slight, while with increasing latitude one gains id the other loses, till at e poles the seasonal inence is supreme. Fig. 42 fter Wiener) shows the aily allowance of rays from e Sun at four different dates in various latitudes of the northern hemishere; it is noteworthy that on June 21st places north of 62° N. get more un the further north they are, the length of the day more than making up r the weaker intensity.

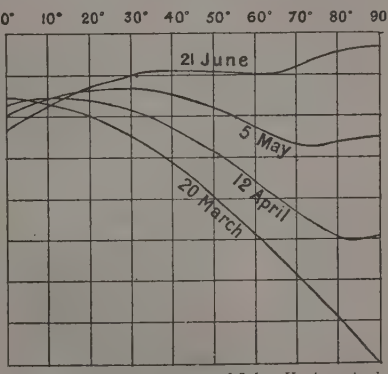


FIG. 42.—*Relative amount of Solar Heat received at each latitude at various periods.*

In the southern hemisphere, the seasons are of course reversed, and it to be noticed that in the southern summer the intensity of the solar rays greater than in the northern, and in the winter less; because during the uthern summer the Earth is in its nearest position to the Sun (perihelion), id during the winter at its greatest distance (aphelion). This partly ccounts for the intense heat of the summer days in Australia and South frica, and generally for the greater severity of the climates of southern titudes. At the same time it must be remembered that what the uthern hemisphere gains in power it loses in time, for the Sun

remains some eight days longer in the northern hemisphere than in the southern.

These complex differences of daily distribution vary from the tropics, where the solar energy is doled out in almost equal daily portions all the year round, to the poles where there are six months' continuous supply and six months' absolute want. The following table gives the relative amounts of solar heat for intervening latitudes, and may be compared with the table of the length of daylight at the end of Chapter II. (p. 25).

Latitude	0°	15°	30°	45°	60°	75°	90°
Amount	1,000	969	879	739	569	447	415

Thus the poles, which would get nothing if the Sun remained stationary over the equator, actually receive more than 40 per cent. of the equatorial amount. The total annual supply of heat to the Earth is estimated as sufficient to melt a layer of ice covering the whole surface to a depth of 176 feet.

Since the Earth's surface is not known to become perceptibly hotter or colder, it follows that, on the whole, the energy received from the Sun must all be given out again, that the Earth must itself radiate to space, as the Sun does. But the two transactions do not occur at the same rate. In the case of the heat rays, radiation into space may be at one time faster, at another slower, than absorption, and the Earth retains at all times a certain balance of heat. The heat thus retained goes to raise the *temperature*, and the temperature at any point is simply the state of the heat account at the moment. The atmosphere is the great banker, and no more striking illustration of its influence can be given than the statement of the results of calculation, which show that while without an atmosphere the mean temperature at the Earth's surface would be 115° F., the mean temperature during the day would be 350° F., and during the night—123° F., a range of 473°.

Effects of Heat on the Atmosphere.—In passing through the atmosphere the rays of the Sun are partly absorbed, the amount reaching the Earth's surface being probably a little over half the total received at the upper limits of the atmosphere. It is obvious that the more oblique the rays, the greater the distance they have to travel through the atmosphere, hence the original differences in the intensity of insolation with high and low Sun are exaggerated. The decrease from the equator towards the poles becomes so much more rapid than before that there is no maximum of daily insolation in high latitudes, but a continuous decrease polewards. But the amount absorbed by the atmosphere varies greatly with time and place. Pure dry air or water vapour probably absorbs a very small proportion of the Sun's rays; the absorption is chiefly due to the presence of an infinity of minute suspended dust particles, which not only vary in number and size themselves, but are altered by the humidity of the atmosphere. When the amount of moisture

sent is small, and the temperature high, the suspended particles of dust dry, but when the humidity rises beyond a certain point a deposit of er takes place on them, increasing their size and absorptive power. er a certain stage the assemblages of particles become sufficiently que to form *clouds*, which intercept practically all the rays from the on the one side, and from the Earth on the other. The atmosphere is, rever, not equally opaque to all rays, it exercises a selective absorption, pping short-wave rays to a greater extent than long-wave rays; hence Sun often appears red when low down on the horizon. A considerable portion of the rays absorbed by the atmosphere ultimately reach Earth's surface as *scattered* rays, hence the sky appears blue, shadows not perfectly sharp, it is not always intensely cold and dark in the de, and in the higher latitudes there is long twilight.

Effects of Heat on Land and Water.—The effect of the solar s upon reaching any point on the Earth depends to a large extent the nature of the surface upon which they fall. On land the t rays are all stopped just at the surface, and a thin superficial er of the ground is heated. The heat is then distributed by con- tion downwards into the ground, and upwards to the layer of air g immediately in contact with it. The latter is removed either by ernal forces causing *wind* or by *convection-currents*; colder air takes its ce, and is in turn warmed and replaced. The surface of the ground obviously become warmed until just as much heat is lost in these two rs as is received. Much depends on the nature and condition of the face; dry soils, for example, such as sand, which contains imprisoned carry off heat more slowly than damp, close soils, and therefore become ch hotter. During the night the surface of the ground loses heat by iation, and heat is brought to it by conduction from below, the whole cess being reversed, except that the layer of air cooled by contact with el ground is not now removed by convection.

Rays falling upon deep water are not all stopped at the surface, but etrate to a depth of probably about five hundred feet, hence the surface ers do not receive as much heat as on land. Evaporation also goes on n the surface of the water, and much of the heat becomes latent. There herefore less heat available for warming the surface of the ocean, and the specific heat of water is much greater than that of dry land, the face of the sea does not rise in temperature to anything like the same ent. Again, the amount of cooling by radiation is much less, and this ct is further reinforced by the cooled water becoming denser and king below the surface, to be replaced by warmer and lighter water n below. Several different causes thus conspire to reduce the rnal and seasonal range of temperature over the sea as compared with land.

Moisture.—The position of moisture as a climatic factor depends elly on the relation between the capacity of the atmosphere for

moisture at any time and place, and the actual amount it contains. In *dry* climate, temperature conditions are such that the atmosphere can ho much more moisture than is available, and it greedily absorbs expos water by evaporation. A *damp* climate may exist where no mo aqueous vapour is present than in the most arid regions; the low temperature producing an approach to saturation. In other words, it the *relative*, and not the *absolute*, humidity that is important.

We have already indicated how the dryness or dampness of the atm sphere affects the transmission of the Sun's rays through it, and therefo modifies the temperature. The condensation of moisture in the form *clouds* or *mist* is chiefly important in its effect on radiation and evapor tion at the surface of the ground. When vapour is condensed in sufficie quantity, the cloud-particles tend to unite, and, becoming too large remain in suspension, fall as rain, hail, or snow. All these forms a included in the general term precipitation and conventionally in *Rainfa* The amount and distribution of the rainfall is the most important elem of climate next to temperature.

The climate of some regions is seriously modified by the deposit o persistent layer of snow on the land surface during winter. Snow is a b conductor of heat, and it therefore serves to prevent the temperature the ground on which it lies from falling rapidly; its surface may at t same time become exceedingly cold through radiation, cooling the la of air resting upon it. A thick layer of snow tends to delay the advent spring, as the temperature of the surface of the ground cannot rise abo 32° F. until all the snow is melted, and meanwhile the soil has beco soaked with ice-cold water.

Wind.—If the atmosphere were of uniform temperature throughc it would so arrange itself that the pressure at any point would sim

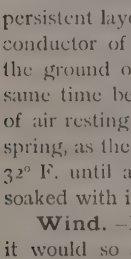


FIG. 43.

be that due to the weight of atmosphere above it, a stable condition of things would be arrived at, and all motion would cease. But there are continuously-acting causes of inequality of temperature, and differences of pressure arise from these, which in their turn produce movements of the atmosphere. The currents so produced are known as *Winds*. The general tendency necessarily is for winds to blow from areas of high pressure to areas of low pressure, but on account of the rotation of the Earth the movement is not direct; it is rather spirally o wards from areas of high pressure and inwards to areas of low pressu the deflection being to the right of the direction of motion in the northe hemisphere, and to the left in the southern (Figs. 43, 44). The gene circulation of the atmosphere is best understood from a study of cha

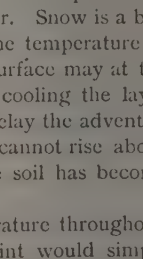
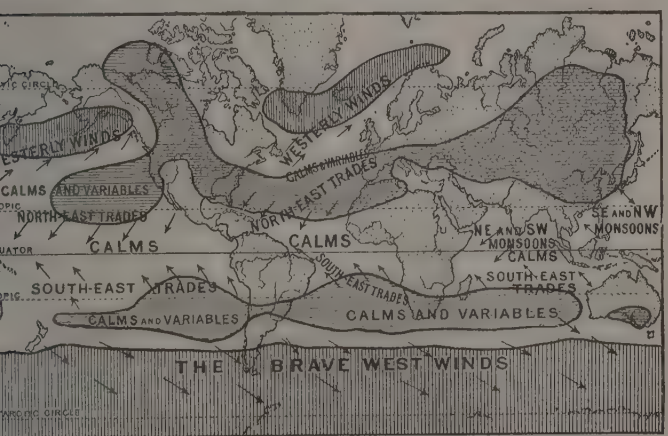


FIG. 44.

wing the average distribution of pressure by means of *isobars;* the ection of flow in the high and low areas can be easily remembered g. 45). So far as is known, pressure is not itself an important element climate, except in the case of mountain stations.

Winds exercise a paramount climatic influence from their action in nsferring heat and moisture. They carry the warm air of low latitudes he colder regions of higher, and *vice versâ*, and they break down the rp division between the air lying over land and over sea, in one ce carrying moist sea air inland, in another carrying dry air from tinental regions over coastal districts to pick up vapour from the ocean. sea, the winds have additional heat-transferring powers from their gging action on the surface waters, which gives rise to drift-currents,



G. 45.—*Average distribution of Atmospheric Pressure, and prevailing Winds of the Earth.*

lowing the winds, and carrying vast quantities of heat with them as they w poleward. Winds have also great influence in promoting evapora- n, removing the saturated layers of air at the water surfaces, and ostituting drier air, which in turn becomes saturated.

The Great Climatic Areas.—It will be readily understood that in ery part of the globe local variations of climate, due to changes in e relations of the principal elements, occur with such endless complexity at it is impossible to give any general description which shall apply gorously to any particular region. It is nevertheless possible to assign rly definite limits to certain areas over which the conditions are more less similar; and a knowledge of the general features of climate within ese areas is essential to proper comprehension of the conditions found

within any part of them, such as are described under the headings
different countries.

The simple division of the Earth's surface into Torrid, Temperate, a
Frigid Zones, follows naturally from the ideal temperature conditio
already considered. The rotation of the Earth has, however, such
profound modifying influence on the circulation originally set up
differences of temperature that it is better to base a division into climat
areas on the existing circulation itself, or rather on the distribution
pressure which is its more immediate cause.

The Earth is at all seasons completely surrounded by two belts of hig
atmospheric pressure, one lying in about latitude 35° N., the other in abo
latitude 30° S. On the equatorial sides of these belts pressure diminishes
a minimum near the equator, and on the polar sides a similar diminuti
occurs, extending to very high latitudes, if not to the poles. The circ
lation arising from this distribution of pressure may be summarised
follows :—

EQUATORIAL BELT	Calms and variable winds ..	"Doldrums."
N. INTERMEDIATE BELT	N.-E. and E. winds	"Trades."
S. INTERMEDIATE BELT	S.-E. and E. winds	
N. and S. HIGH PRESSURE BELTS	Calms and variables.	"Horse latitudes."
HIGHER NORTH LATITUDES ..	Variable W. and S.-W. winds	"Westerly variables."
HIGHER SOUTH LATITUDES ..	Strong W. and N.-W. winds	"Brave west winds."

The position of all these belts changes with the season ; but the ran
of movement is comparatively small, and the extreme positions are reach
from one to two months after the solstices. In the Atlantic, for examp
the north-east trade winds extend from latitude 3° N. to 26° N. in Marc
and from 11° N. to 35° N. in September. When the equatorial calm b
moves more than a few degrees from the geographical equator, t
trade winds from the opposite hemisphere are drawn across and d
flected so as to have a westerly component, and they then receive t
name of *Monsoons*. A south-west monsoon prevails in the Pacific nor
of the equator during the northern summer, and a north-west monso
in the Indian Ocean south of the equator during the southe
summer.

If the Earth presented a surface entirely covered by water, the boundi
lines of these climatic belts would probably exactly follow parallels
latitude round the whole circumference. This typical arrangement
always developed over the great oceans, and most perfectly in regio
farthest removed from land influences. The *Equatorial Belt* is remarkab
for its sultry, humid atmosphere, its constant and copious rains, and f
the strongly marked diurnal, as contrasted with seasonal, changes. In t
Trade-wind Belts the air is dry, because it is moving from colder to warm
latitudes and cannot pick up moisture fast enough to maintain saturatio
and the rainfall is light ; these regions are remarkable for the steadine
of their winds and for the strong evaporation from the surface of t
sea, producing great saltness of the surface waters. The *Horse Latitud*

emble the equatorial belt in their light, variable winds and frequent
ns, but present a marked contrast in the dryness and freshness of the
and the light rainfall. Where the *Westerly Winds* of higher latitudes
rail the rainfall is chiefly associated with irregular, stormy disturbances
ddies in the general flow known as *cyclones*, which usually follow the
rse of the main current, and occur most frequently in winter. In the
rmediate regions, between the limits of migration of the various belts,
rked seasonal variations come into play, the climatic belt nearer the
ator assuming control during the summer, and that nearer the pole
vinter : amongst the districts affected in this way, particularly as regards
and dry seasons, the countries round the Mediterranean, South Africa,
thern Australia, parts of Chile, and the West Indies may be specially
ntioned.

Influence of the Land.—The chief modification of the normal
natic arrangement produced by the presence of the great land surfaces
ue to the greater range of temperature. The air on the land surface
n the whole, hotter than the air on the sea during summer, and colder
vinter ; hence pressure tends to be relatively greater in winter and
in summer, and there is a general movement seawards in the former
on and landwards in the latter. A kind of monsoon effect is thus
duced, alternately weakening and reinforcing the normal circulation,
its action in deflecting the normal currents is apparent on all the
tinental coasts, notably in Africa and in Australia. In the case of
ia and south-eastern Asia, the vastness of the continental surface,
bined with its great central elevation, produces a complete reversal
ne normal conditions during summer, the south-east trades are drawn
oss the equator, and penetrate inland as the south-west monsoon, a
ng, warm wind bearing immense quantities of moisture. During
ter, the outflow from the excessively cold regions of Central Asia
ngthens the north-east trade over India, and deflects it into a
th-west wind over China and south-eastern Asia, the wind usually
ing the name of the winter monsoon. These seasonal winds are
far the most important of the continental winds, and the "monsoon
on" over which they blow forms a distinct geographical area by
f.

Analogous to the seasonal changes, a diurnal change occurs on the coasts
egions where the diurnal range of temperature is great. These are
wn as *Land and Sea Breezes*. When the winds due to the general
ulation are not powerful, a wind blows landwards during the hotter
rs of the day, and seawards during the night ; but if they blow with
siderable force, as in the trade-wind belts, the diurnal influence merely
ws itself by weakening and strengthening, or deflecting, the normal
rent.

Influence of Vertical Relief.—In addition to the temperature
urbances produced by the land masses, modifications in the

distribution of moisture must be taken into account, and in t
connection the *Relief* of the land surface is specially important. Wh
a current of moist air moves inland from the sea, its supply of vapo
is cut off. If it is now warmed, as in moving from higher to low
latitudes, the air becomes dry, and the country over which it pas
has an *arid* climate. This is best seen in the desert plains of t
trade-wind region—in Arabia, Persia, the Sahara, and Central Austral
But if, on the other hand, the air is cooled, it is unable to retain all
moisture, part of which is deposited as rain. Such cooling can take pla
in a number of ways, but by far the most common and most effecti
is by the air ascending from lower to higher levels of the atmosphe
There are two main causes which give rise to such ascending movemen
the formation of eddies or cyclones, and the forcing up of the air
direct contact with elevated land. The two causes differ in respect th
the latter necessarily operates only on land, and is a definite fixed eleme
while the other is most effective at sea, and is an erratic and uncerta
quantity at all times. Probably most land stations owe their yearly to
of rainfall to both causes combined, but the cyclonic agency is much t
less important between the horse latitudes, and much the more importa
beyond them.

A current of air meeting a range of mountains accordingly depos
a heavy rainfall on the weather side. The condensation sets free late
heat, which prevents the rapid cooling of the air and encourages its furth
ascent, at the same time drawing up more air from below. The enormo
rainfall of the monsoon area is largely due to the height and continu
of the mountain mass of the Himalaya, and the trade-winds, dra
inwards and deflected by the great range of the Andes, distribute
generous rainfall over Brazil.

After crossing a range, the current of air may pass on as dry wi
or if the range is sufficiently high it may disappear from the surfa
circulation altogether. In either case, the lee-side of the range is dist
guished by a dry and often an arid climate : if the air is drawn downwa
into valleys from the heights it becomes heated by compression, produci
the Föhn or Chinook winds of the northern valleys of the Alps and t
eastern side of the Rocky Mountains. A range of hills does not in
respects act like a lofty range of mountains; but when the height does n
reach the snow-line the maximum rainfall occurs a little to leeward of t
crest over which the wind blows.

From the direction of the prevailing winds, it follows that between t
horse latitudes dry regions are found towards the western sides of t
land masses, as in Mexico and Chile, while in the westerly-wind belts th
occur towards the east, as in Central Asia, the region of the Great Ba
in the United States, and the south of South America. When the regi
is not actually desert, a large proportion of the rainfall is often due
merely local disturbances of the thunderstorm type, as in the easte

ıties of England, where August is the wettest month of the year
ıay be well to point out here the immense advantage enjoyed by
ope through the absence of a high mountain range near the western
gin ; the moisture of the Atlantic penetrates to a great distance east-
l, and is distributed in moderate rainfall over a large area.

Mountain Climates.—Climate changes with increase of height above
evel in much the same way as with increase of latitude, except that
radiation effects become stronger, as the rays do not pass through
reat a thickness of atmosphere. Generally speaking, temperature
absolute humidity diminish as height increases, and rainfall becomes
ter up to a certain level ; relative humidity shows no very regular
ation. Everything, however, depends on the form of the elevated
ace ; a level plain retains the same characteristics of climate through
ide range of elevation, while the climate of a sloping mountain-side
odified by the ascending and descending currents of air. Ascending
ents of course tend to discharge moisture, while descending currents
usually caused by cold air sliding downwards into valleys below :
double effect diminishes the range of temperature, and produces a
ate approximating to the "oceanic" as opposed to the "continental"

.

Climates of High Latitudes and Polar Regions.—The normal
rease of temperature from the equator to the poles should produce
adual increase of pressure in that direction, but the rapid movement
ir in the belts of westerly winds, of which the poles are the centres,
ces a centrifugal tendency which would make pressure greatest at the
r margins of the rotating rings (*i.e.*, in the horse latitudes), and less and
towards their central points. Hence the normal temperature gradient
the centrifugal forces are constantly acting against one another, and
former is helped at the expense of the latter by the resistance offered
ne westerly currents by temperature disturbances and by friction, both
which are greatest on a surface of land or rough ice, and least on the
n sea.

The northern polar area consists of an ice-covered ocean almost entirely
ounded by land. The only considerable tract of water is the extension
he North Atlantic, known as the Norwegian Sea, and the prevailing
terly winds accordingly reach their highest development in the
hern hemisphere in this region, assisting themselves further by the
t currents, which the configuration of the land allows them to push
to the north. Elsewhere, land and ice surfaces neutralise the cen-
gal element and sometimes overcome it altogether ; winds are light
variable, stormy weather is comparatively rare, and there is a small
fall.

In high southern latitudes, the uninterrupted belt of the Southern Ocean
ws the "circum-polar eddy" to have full play until the coasts of the
arctic continent are approached. Pressure falls continuously, and

strong westerly winds are met with up to about 60° S. latitude. Beyo this there are indications that a polar cap of land and ice neutralises or verses the arrangement, perhaps more completely than is the case in north as the winds in the neighbourhood of the Antarctic circle blow m frequently from an easterly quarter, indicating an increase of press towards the south.

Climate Diagrams.[1]—In Part II. many diagrams are given (*e.* Figs. 59, 60) showing the distribution throughout the year of rainfall a atmospheric temperature. The seasonal range of these elements is of ev greater importance than the mean annual values. In each case the te perature curves and rainfall columns of two places, the situation of wh accounts for their difference of climate, are given for comparison. Thus contrast of continental and oceanic climates is shown in Fig. 95, and that rainfall during a prevailing sea-wind and land-wind respectively in Fig. 2 The difference in seasonal distribution of temperature between the north and southern hemispheres may be appreciated by comparing Figs. and 313.

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For notes on climate of special regions in all parts of the world, see the *Meteorologi Zeitschrift*, published monthly in Vienna; the *Quarterly Journal* of the Royal Mete logical S ciety; the *Journal* of the Scottish Meteorological Society; for the British Em see *Symons's Meteorological Magazine*, published monthly in London; for the British Is the *Weekly Weather Report* of the Meteorological Office, London; and for North America, *Monthly Weather Review* of the United States Weather Bureau.

[1] By the Editor.

CHAPTER VIII.—THE DISTRIBUTION OF LIVING CREATURES

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The Main Problem.—The main problem in the study of the geographical distribution of plants and animals is to explain the existing state of affairs, and to obtain answers to such questions as these:—Why are certain forms of life here and not there, there and not here? Why is it that all the Marsupials except the American opossums are now restricted to Australasia? Why are there no Amphibians on oceanic islands? How is it come about that several species of Tapir occur in South and Central America and the only other one in the far distant Malayan region? Why is the flora of the Steppes such as it is? Why are certain regions tree-less and others grassless? How is it that the same Alpine plants are found on widely separated mountains and not in the intermediate areas? Why is there a striking contrast between the flora of New Zealand and that of Australia? Some of these questions may be answered readily, others are very difficult, but they are all of the same general nature—they concern the *factors which determine distribution*. To analyse out these factors is the main problem; and the difficulty of the subject is due to the fact that in most cases an observed state of affairs is the result of numerous co-operative factors, all variable, and all inadequately known. Many of the pre-Darwinian studies in distribution are vitiated by their insistence on one or two factors to the exclusion of others which are certainly operative. Some investigators insisted on physical boundaries, others on conditions of climate, others on means of dispersal, and so on; but there can be no solution of the problem until all the factors are recognised, and recognised as co-operative.

Peculiarity of Physical Conditions.—Apart from a few resting-stages of Algæ, and a few micro-organisms whose precise position is uncertain, there are no plants in the Deep Sea. Their absence is sufficiently explained when we remember that one of the physical conditions of the great abysses is darkness, broken only by the fitful gleams of "phosphorescent" animals, and that for all plants except Fungi and some parasites, light is an essential condition of life. The Great Salt Lake of Utah has an extraordinarily high salinity; this physical fact is enough to explain why it contains only two or three animals, especially the brine-shrimp, *Artemia fertilis*, instead of the dense population usually found in lakes.

Peculiarity of the Organism's Constitution.—While some

animals, like the flounder, salmon, and eel, can adjust themselves to fres or salt water, there are others which are fatally sensitive to more than minimum of salt. This is strikingly true of Amphibians, which absor large quantities of water through their skin, and are killed at once if th water be salt. This constitutional peculiarity of the Amphibian race i obviously enough to explain why they are absent from oceanic islands While some animals seem very indifferent to temperature, like the tige which ranges from the hot Malayan jungle to the icy Siberian tundra there are many of more sensitive constitution. Thus the guanaco, th South American relative of the camel, cannot stand tropical heat; there fore in Peru and Ecuador it is only found many thousands of feet up th mountains, while further south in Argentina it occurs on the plains.

The Means of Dispersal.—On a solitary island of volcanic origi there are rarely any mammals, and this is at once explicable when w remember that most mammals have very limited powers of swimming There may be seals or porpoises about the shore, or bats in the caves, an their presence is as intelligible as the absence of others. The occasiona occurrence of small rodents on such an island is usually explained b postulating a wreck or a drifting raft.

What is called a cosmopolitan distribution is not always due to the sam cause, but the broad fact may be noted that wide distribution is *ofte* associated with unusual facilities for dispersal. Thus mice, so readily con cealed, have followed man's wanderings everywhere. Thus, too, we ma explain the fact that insects are represented almost everywhere; most ca fly, many are easily drifted with the wind, some occur about floating wood or can be carried from place to place in the form of eggs or cocoons.

Original Headquarters.—If it were, and had always been, the cas that the body of a dead animal simply melted away, like the stranded jelly fish on the beach, we should now be entirely ignorant as to the origina headquarters of the different races. If, on the other hand, there had bee any arrangement whereby representative samples of the faunas of succes sive geological ages could have been preserved in the rocks, we shoul have certain evidence on this point. But what has actually happened lie between these two extreme possibilities. There *is* a geological record i the fossil-bearing rocks, the graveyards of the buried past; but this geo logical record is very imperfect. The imperfection is explained partly b the softness or rapid decay of many animals and plants, partly because man of the rocks which might have contained fossils have been fused, metamor phosed, or worn down again into dust, and partly by other reasons The record is like a library in which whole shelves have been destroye by fire, while others are left in disorder, in which most of the sets o volumes are incomplete and most of the individual books are sadl damaged. At the same time, there *is* a record, the study of which give us some warrant for speaking of original headquarters or evolution centres. It seems fairly certain from geological evidence that the northern

misphere was the original home of most Mammals, whence they have read southwards ; that the Edentates (sloths, ant-eaters, and armadillos) d their evolution-centre in South America ; that Africa is the head-arters of the legions of antelopes ; that there were never any Anthropoid es in the New World, nor any Mammals higher that Marsupials indi-nous in Australia ; and that Madagascar was the headquarters of the e of lemurs.

Geological Conditions.—There is no more impressive fact con-rning biological distribution than "Wallace's Line" (Fig. 280), which rpetuates the name of one of the most successful workers on the subject. is line follows the narrow but *deep* strait which separates the islands of li and Lombok, and is continued northward along the Makassar Strait tween Borneo and Celebes. Soundings show that the strait is deeper n those which separate the other Malayan islands, and this physical fact comes significant when we learn of the diversity of the fauna on either e of the line. There seems no doubt that we have here to do with an l-established geological barrier to dispersal.

Even the scanty geological information which we possess, corroborated soundings which show the shallowness of the sea, make it practically rtain that at no very remote date Asia was connected with America by and-bridge across Bering Strait. This fact enables us at once to under-nd the presence of remains of the horse, bison, and mammoth in aska, and to understand better the many common features between the rasian and the North American faunas.

Bionomic Relations.—The presence or absence of particular plants animals in a given region may be sufficiently accounted for by the ctors already mentioned, or even by one or two of them, but where the ological evidence shows that organisms once inhabited a region in ich they are no longer found, we must fall back for explanation on that ge phrase, "the struggle for existence." This includes all the more or s critical responses which living creatures make to changes in their vironment, both inanimate and animate. Changes in the inanimate vironment, *e.g.*, floods, lava-flows, slow alterations of climate, equally w crust-movements, may decide the question of survival ; and so may e very important factor of intra-organismal struggle. On a Scottish hill-e we may watch from year to year the silent struggle between bracken d grass ; the same struggle, though different in intensity, is characteristic the tropical forest. Such well-known cases as the struggle between ickly-breeding "vermin," *e.g.*, voles, and the beasts and birds of ey, are merely striking illustrations of a universal process. Often a lance is struck and both parties manage to survive, doubtless after a ocess of mutual adaptation ; often, however, there is a meeting of compatibles, thus we do not find horses and tsetse flies flourishing gether. Not less important is the struggle between plants and animals ; e leaf-cutting ants have played their part in determining what trees can

survive in the Brazilian forest, and it is obvious that a parish rich in corn fields with cleanly kept hedges, and poor in woods or meadowland is no likely to be favoured by insects which live on nectar.

Summary as to the Factors in Distribution.—At least si main factors have contributed to the present distribution of organisms, an none of these can be ignored. They may be grouped in pairs :—(*a*) Th physical peculiarities of the region under discussion, and the constitutiona peculiarities of the living creatures ; (*b*) the original headquarters of th stock (usually uncertain), and the means of dispersal in each case ; (*c*) th physical changes of climate, Earth-movements, &c., in the region, and th changes brought about in the struggle for existence between the variou living tenants of the country. It may even be permissible to use mathematical expression, and say that the distribution is a function of si factors, some of which are variable dependently and others independently

But besides the six main factors there are minor ones, and the problen becomes very complex. Thus although man has not lived long upon th Earth compared with many other living creatures, he has been the direc cause of enormous changes in their distribution ; such as the introductio of rabbits in Australia, sparrows in America, and the practical extermina tion of the bison and the beaver. One of the most curious extensions c the life area of a species is the spread of the jigger, a South America insect, which passes its early stages of development as a parasite in the fee of men. It was accidentally introduced into West Africa in 1871, wa gradually spread eastward by the increase of traffic across Africa, and i 1898 appeared for the first time in Zanzibar.

Some Elementary Facts as to Distribution.—(*a*) Widely sepa rated countries may have similar fauna and flora. Dr. Wallace begin his *Island Life* by supposing a traveller to pass from Great Britain t Northern Japan. "He is now separated from his starting-point by th whole width of Europe and Northern Asia, by an almost endless succes sion of plains and mountains, arid deserts, or icy plateaux, yet when h visits the interior of the country he sees so many familiar natural object that he can hardly help fancying he is close to his home." . . . "Ther are also, of course, many birds and insects which are quite new and pecu liar, but these are by no means so numerous and conspicuous as t remove the general impression of a wonderful resemblance betwee the productions of such remote islands as Britain and Jesso."

(*b*) Closely adjacent countries may have quite different faunas an floras. Thus, as Dr. Wallace points out, the distance from Australia t New Zealand is trivial when compared with that between Britain an Japan, but the Australian who journeys to New Zealand finds an entirel new living panorama. "Kangaroos and wombats there are none, the bird are almost all entirely new, insects are very scarce and quite unlike th handsome or strange Australian forms, while even the vegetation is a changed, and no gum-tree, or wattle, or grass-tree meets the traveller

." An even more striking case is the contrast between the islands of i and Lombok, in the Malay Archipelago, and the same fact is illus- ed by the contrast both in fauna and flora between Florida and the ıamas.

(*c*) Regions with very distinctive tenantry are in many cases connected transition areas. Prof. Heilprin illustrates this by supposing the natura- to journey southwards from the ice-covered fields of Arctic America to Equator. "New features are being constantly added, and old ones ıinated, but the interchange is effected so gradually that it becomes icult to determine the limitations that properly define one fauna from ther." Yet the fauna at the end of the journey is sharply contrasted h that which surrounded the traveller at its beginning.

(*d*) On the other hand there is no lack of instances which show sharp imitation. The mammalian fauna of Australia, apart from recent ıorts (*e.g.*, rabbits), the bat-tribe, and marine forms, consists wholly of rsupials and Monotremes; with the possible exception of the dingo, re are not even fossil remains of Mammals higher than Marsupials; l, furthermore, there are now no Marsupials beyond Australasian limits ept the family of American opossums.

(*e*) Another striking fact is the "discontinuous distribution" of certain es, by which we mean that examples of a type may occur in widely arated regions without there being any living representatives in the rmediate areas. The generally applicable explanation is that the type uestion once enjoyed a wide distribution, as the rock records show; that lespread elimination has occurred; and that the conditions favourable survival happen to have been found in areas far apart from one another. us of the genus Tapir, there are some four species in South and Central erica, while the only other species occurs in Malacca and Borneo. ilarly the family of Camelidæ is represented by one genus in the Old rld and another in South America; and the insectivorous Centetidæ are resented by five genera in Madagascar, and one in Cuba and Hayti.

These five sets of facts must serve to illustrate what may be called the ientary data of distribution.

Zoo-Geographical Regions.—In 1858, Dr. P. L. Sclater proposed recognise six main zoological regions:—(1) *Palæarctic* (=Europe, rthern Africa, Northern and Central Asia); (2) *Ethiopian* (=Africa south the Atlas, and Madagascar); (3) *Indian* or *Oriental* (=India, South- stern Asia, and part of the Malay Archipelago); (4) *Australian* (=Australia, h New Guinea, New Zealand, and Polynesia); (5) *Nearctic* (=America as south as Mexico); and (6) *Neotropical* (=Central and South America, and West Indies). This scheme was mainly based on a study of the distribu- ı of birds, but Dr. A. R. Wallace soon showed that it worked well for mmals also, and it has met with wide acceptance. Among the more ortant emendations which have been suggested are the following:— the union of Palæarctic and Nearctic in one Holarctic region; (*b*) the

establishment of several other special regions, *e.g.*, Polynesian, Hawaiian, Malagasy, Sonoran or Medio-Columbian, Arctic, and Antarctic; (*c*) the definition of several transition-areas, *e.g.*, around the Mediterranean and Lower California; and (*d*) the grouping of the regions in three major realms which correspond to the three great evolutionary centres of mammals — I. The *Notogæic* Realm (including Australian, Polynesian, Hawaiian, and Australo-Malayan regions); II. The *Neogæic* Realm (including the Neotropical region); and III. The *Arctogæic* Realm (including the Malagasy, Ethiopian, Oriental, Holarctic, and Sonoran regions).

Phyto-Geographical Regions.—In spite of enormous labour spent upon the subject, it remains quite undecided what topographical and other divisions may be most profitably used in grouping plants according to their past and present distribution. When the plants of the world are known as thoroughly as those in Europe, and when the factors of distribution throughout Europe have been as carefully analysed as they have been for Great Britain, then the question whether we should recognise fifteen or twenty-five or thirty-five floral regions will begin to be answerable.

Humboldt relied mainly on latitude and longitude and height above sea level in his pioneer attempt to group plants geographically; and in this he was followed by Meyen. Schouw (1823) introduced the statistical method characterising his proposed twenty-five regions by the numerical preponderance of certain races of plants, *e.g.*, the "Magnolia region," the "Cinchona region," and so on. Grisebach (1872) recognised twenty-four areas, and laid particular emphasis on the topographical and climatic barriers which separate one area from another. Engler (1882) struck a new note in seeking to relate the present distribution of plants to that in Tertiary times. Drude (1884) followed on similar lines, and sought to combine a recognition of all the factors. His system is very widely used: it recognises three main divisions:—Boreal, Austral, and Tropical, and fourteen smaller regions, each again divisible.

Until the subject is further advanced, it seems most profitable for the teacher and student endeavouring to understand the nature of plant distribution (*a*) to think out the problem in relation to the nearest well-marked area—Great Britain, Ireland, New Zealand, &c.; and (*b*) to gain by means of photographs and pictures concrete impressions of the vegetation in different parts of the Earth.

Groups of Land-Plants.—Every traveller has noticed that the same or similar plants tend to occur in similar areas, and the field-botanist can confirm this in his more restricted rambles. Wood and heath, links and shore, moor and bog, are more or less distinctly marked, wherever there are, by plants characteristic of each. Two arid shores a thousand miles apart *may* show identical or nearly related plants, and even if there be little structural affinity in the actual tenants, there is likely to be superficial resemblance brought about by similar adaptations to simila

ironment. Thus, the prickly cactuses which predominate in one arid ion may be represented by similar, but in reality very different prickly rges in another area with similar conditions. Similarly, the ornithologist ects to find wading and swimming birds about a lake, whether it be ican or South American, but it does not follow that the birds will be the ie in the two cases. In short, what are called "characteristic vegeta- is," are in many cases only what the biologist calls physiological or ptive groups. They owe their similarity to the fact that, in given con- ons, only plants of a certain constitution or with certain adaptations are e to survive. A few examples of the more typical groups may be en.

The *Tundra*, of north-eastern Europe and northern Siberia, where the per strata of the soil remain frozen perpetually, is characterised by ens, like the "reindeer-moss" (*Cladonia rangifera*), and by mosses, h as species of *Polytrichum*, *Dicranum*, and *Sphagnum*. In more pro- ous places, however, there may be bulbous plants, dwarf willows, and sses; and in spring, the monotony of the so-called "barren-grounds" sometimes broken by short-lived brilliant blossoming. In fact, the dra passes into the *Moor*, with its mosses, grasses, sedges, cranberries, occasional willows, and birches, or into the *Bog*, with its bog-myrtle peat, cotton-sedge and asphodel, grass of Parnassus and bog-pim- nel, and more thoroughly aquatic forms like bladderwort and marestail. ilarly, the dry tundra is connected through the moor with the well- ned *Heaths* where almost nothing will grow but heather.

The *Grassy Vegetations*, such as meadow-lands and savannas, are racterised by the predominance of grasses and sedges, whose long allel leaves are well suited for crowded life. It is obvious that part of problem of civilisation is the establishment, extension, and intensive ure of these grassy vegetations, which include our cornfields. But se again in some of their forms pass into the *Steppe Vegetation*, charac- sed by plants which are able to survive a prolonged summer drought require a very short vegetative period. Thus trees are practically ent, and there is an abundance of "Xerophytes," *i.e.*, plants adapted to ıstand great dryness. The Thyrsa-grasses (species of *Stipa*, &c.) are racteristic of the South Russian steppe; the goose-foots (*Chenopodiaceæ*) und in the salt-steppes. The prairies of North America are probably richest of the steppe-vegetations, and are by no means treeless, while pampas of South America and the grassy plains of Australia repeat ilar characteristics.

Woods and Forests extend in suitable places from the equator to the thern and southern climatic tree-limits, the essential condition of their urrence being that the average temperature during the vegetative iod of the year does not fall below 46° F. But the variety in the com- ent trees and in the undergrowth is very great, as is evident when we ıpare the Equatorial forests, the Indian jungle, the Savanna woods of

Brazil, the pine-forests of the north, the park-lands of the Amur, and the rich green woods in sheltered English valleys.

Groups of Land Animals.—As with terrestrial plants, so with land animals, an arrangement into physiological or adaptive groups may be readily made, and if its limitations are recognised it serves a definite intelligible purpose. Thus we may distinguish, for example, a Boreal group, in some marked way adapted to the exigencies of an Arctic environment, *e.g.*, by permanent or seasonal whiteness as in the polar bear, Greenland falcon, snowy owl, Arctic fox, Hudson's Bay lemming, and Arctic hare. Other groups may, in like manner, be identified with other specialised regions. In books like Brehm's "From North Pole to Equator" ample materials will be found for what may be called impressionist pictures of the adaptive peculiarities of the various groups of animals which frequent steppe and tundra, desert and forest, Alps and river-banks.

Pelagic Animals and Plants.—While life is almost universally distributed over the Earth, wherever there is food, air, moisture, heat, and some light, it is possible and profitable to distinguish various kinds of habitats whose conditions make them in some measure discontinuous. Such are the Open Sea, the Shores, the Deep Sea, the Fresh Waters, and the Dry Land, each of which is tenanted by characteristic forms of life.

The term *pelagic* is applied to all organisms that habitually live in the open sea, either drifting (Plankton) or actively swimming (Nekton). As regards animals, there is great variety of type, from the minute *Noctiluca* which sets the waves aglow in the short summer darkness to the giants of modern times—the whales. As regards plants, there are almost none above the level of unicellular Algæ, *e.g.*, Diatoms, but of these there are immense numbers both of species and individuals. This is a fact of fundamental importance, since these minute plants furnish the basal food supply of all pelagic animals. Just as we may say of land animals that "all flesh is grass," so we may say of marine forms that "all fish is diatom."

The pelagic animals include a few genera of Foraminifera, rich in species, all the Radiolarians, many Infusorians, jellyfishes, Siphonophora like the Portuguese man-of-war, Ctenophores like Venus's girdle, many worm-types such as the arrow-worm (*Sagitta*), Chætopods, a legion of Crustaceans, a few Insects (Halobatidæ), such Molluscs as Pteropods Heteropods, many Cephalopods, free-swimming Tunicates such as *Salpa* and *Pyrosoma*, many fishes, a few turtles and snakes, besides some well-known birds and mammals. It should also be noted that many of the shore animals have pelagic larvæ. The life-conditions of the open sea are favourable; there is no lack of room, of moisture, or of sunshine, and the rapidly multiplying small forms supply abundant food for the larger. The rock records bear witness to the early origin of pelagic life.

In adaptation to their habitat, pelagic animals tend to be lightly built, delicate, translucent, and often bluish in colour, and with external organs suited for drifting and swimming. The frequent "phosphorescence" is

obably in some cases protective, but its meaning is still very uncertain. uge numbers of individuals usually appear in shoals, which is explained rtly by the abundant food supply afforded by the Algæ, partly by the olific reproduction common among lowly organised animals, partly by e relative mildness of the competitive element in the struggle for istence, and partly by physical conditions of currents and the like, which termine areas of comfortable subsistence and routes of migration. While rtain types are very widely represented, there is also a local distribution species which shows that the pathless sea has zones and boundaries e the dry land. There are two theories of the origin of pelagic forms, ie regarding them as on the whole primitive, the other as mainly due migration from the shores.

The Littoral Area.—This area includes (*a*) the shore in the popular nse, with its heterogeneous jetsam of dead seaweeds and animal remains, d its own characteristic tenantry of sandhoppers and salt-worts; (*b*) the rict littoral zone, exposed only at low tide, with its acorn-shells, peri- nkles and limpets, green seaweeds and occasional sea-grasses; (*c*) the minarian zone (to 15 fathoms), where the great pennon-like seaweeds at amid an extraordinarily keen battle for life; and (*d*) the Coralline ne (15–40 fathoms) where seaweeds become gradually sparser, though e population of *débris*-eating and carnivorous animals is even denser.

The conditions of shore-life are perhaps the most stimulating in the orld. It is the meeting place of air, water, and land. It is the area of cissitudes—ebb and flow of tides, freshwater floods and drought under e hot sun, gently lapping waves and violent breakers, slow changes of bsidence and upheaval. The alternations of day and night, of summer d winter, are more felt there than in the open sea. The tenantry is rrespondingly rich and various, including representatives of almost every mily from the Infusorians up to birds and an occasional mammal.

The rock records show decisively that the shore fauna was of very ncient origin, and there is some evidence to warrant the conclusion aintained by some (*e.g.*, Pleffer), that a very uniform shore-fauna persisted ntil Tertiary times. As to its origin, there are two main theories, that hich regards it as in the main primitive, and that which regards it as in reat part due to migrations from the open sea.

The Abyssal Area.—It is not likely that the floor of the deep sea ill ever become a familiar hunting ground to the naturalist, yet almost very year since the days of the *Challenger* has added some interesting etail to our darkly-shaded picture of it. We know that there is practically o depth-limit to the distribution of animals, though plants are almost nknown below the so-called light-limit, and the more moderate depths em to be more richly peopled.

The population of the deep sea includes representatives of most of the pes of animals from Protozoa up to Fishes. There are Foraminifera abundance, many flinty sponges, some corals and sea-anemones, not a

few Annelids and other worms, especially on the red clay, Echinoderms of every kind, legions of Crustaceans, abundant Molluscs, and many peculiar fishes—the tyrants of that dark world—some blind, some half-blind, and others with "darkness-eyes," catching perchance the fitful gleams of phosphorescence.

The conditions of life in the Abyssal area are peculiar to itself in the following particulars :—(1) There is practically no light apart from that produced by phosphorescence ; (2) the temperature is low (about 34° F.), and very uniform ; (3) it is an area of enormous pressure, thus at 2,500 fathoms the pressure is about two and a half tons per square inch ; (4) it is quite calm, untouched by the severest storms ; (5) the water is relatively rich in oxygen ; (6) it is virtually plantless ; (7) it is probably without putrescence, for although pelagic bacteria (formerly denied) are now well known, there is no secure evidence of their presence in the great depths, and there can be no true rotting without bacteria ; (8) the animals necessarily feed upon one another, but fundamentally upon the organic *débris* which sinks from above, and not least upon the ceaseless rain of pelagic Protozoa ; (9) it is very uniform over vast areas, and many forms have a very wide range.

The generally accepted view is that the deep sea did not become a possible home of life until perhaps Cretaceous times, until the Poles cooled and the cold water rich in oxygen sank to the great depths. The affinity between abyssal animals and those found in shallower water in boreal seas has often been pointed out, and it is probable that the deep sea was largely peopled from the poles, or in any case from the shores.

The Fresh Waters.—As in the case of the sea, it seems useful to distinguish (*a*) the *littoral* forms, which occur in rivers, on the shores of lakes, and in shallow water ; (*b*) the *surface* forms, or Limnoplankton ; and (*c*) the *deepwater* forms. Thus among plants, the rushes, irises, marsh marigolds, water buttercups, water-lilies, bladderworts, stoneworts are characteristically littoral ; numerous green algæ occur in the open water and form an important source of food to animals ; while few are known to occur on the floor of deep lakes. Among animals, the deepwater forms are chiefly Rhizopods, Turbellarians, Nematodes, Leeches, Chætopods, Crustaceans, a few Arachnids, some insect larvæ, and not a few Molluscs. Many have probably migrated from the shore of the lake, where the same or similar forms may also occur, along with others distinctively littoral, *e.g.*, the Hydra and the freshwater sponges. Very distinct, again, are the surface forms—small Crustaceans, Rotifers, Infusorians, &c.—which present a marked analogy of structure and habit with the marine Plankton. The Entomostracan Crustaceans are of much practical importance in forming the fundamental food supply of many freshwater fishes.

As regards origin, freshwater animals have been divided into three sets. (*a*) The *recent migrants* which may be illustrated by the dozen or more marine species which are at present learning to live in the Kaiser-Wilhelm

nal in which the water is on the whole fresh, or by the simple polype *rdylophora* which has been carried by boats up rivers and canals. It is obable that the American freshwater polype *Microhydra ryderi* which erates swimming-bells or medusoids is a relatively recent migrant.

(*b*) The *archaic* freshwater animals, which must have been at home freshwater since ancient times and have been isolated by Earth-ovements in basins far from the present-day sea, may be illustrated by e African freshwater Medusoid (*Limnocodium*) which was found in Lake nganyika, 2,700 feet above sea-level. The widely distributed old-shioned Crustacean *Apus*, and the double-breathing mud-fishes (*Ceratodus* Queensland rivers, *Protopterus* in the Gambia, and *Lepidosiren* in the nazon), are other instances. In Lake Tanganyika, according to Moore, o faunas co-exist—(1) "The normal and ubiquitous freshwater stock"; d (2) a series of very divergent forms, notably molluscs, which appear to "the dwarfed and stunted remnant of a fauna that the sea left behind probably as far back as the Jurassic period.

(*c*) The *cosmopolitan forms* include some Protozoa, freshwater sponges, ydra, some Turbellarian worms, and numerous small Crustaceans, like *clops*. Their uniformity seems to be due to three or four factors—(1) igration from the sea would be effected in different parts of the world animals of similar constitution, and the conditions of adaptation and rvival, being closely alike in different freshwater basins, would tend to ork out similar results; (2) in lakes which arose as relict-seas and ntained originally somewhat similar samples of a fairly uniform pelagic una, *e.g.*, before Cretaceous times, the conditions of elimination would nd to be much the same everywhere, and the result would be uniformity the survivors; (3) there are not a few of the smaller forms which are adily carried on birds' feet and otherwise from one water basin to other.

Dry Land.—As the majority of animals, from the simplest up to and cluding Amphibians, are either themselves aquatic or have their juvenile ages adapted for aquatic life, the presumption is strong that the dry land as originally peopled slowly and gradually by migrants from the water. ery gradually, of course, must the transition have been effected, now by wandering worm and again by a curious Crustacean, here by a fish-like rm clambering in the lagoon and there by an ancestral Amphibian which arned to survive the drying up of the pool where it was hatched.

Besides pelagic, littoral, abyssal, freshwater, and terrestrial groups, hers might be distinguished; thus there are aerial animals, such as rds and insects, and aerial plants, like the epiphytic Orchids and Aroids, like the Bacteria which drift about in the air; there is the not very undant population found in brackish water; there is the "cryptozoic" una of caves and grottoes, some members of which appear to be ancient licts, and there are the but little known Fungi found in similar places. ver forty species of animals are known from the Mammoth Cave of

Kentucky, and the total number of recorded cave-dwellers is about three hundred. Finally, in considering the different homes of life, account must be taken of the immense number of plants and animals which live as parasites in or on other organisms.

Relations between Life Areas.—According to Moseley, "The fauna of the coast has not only given origin to the terrestrial and freshwater faunas, it has throughout all time, since life originated, given additions to the pelagic fauna in return for having received from it its starting point. It has also received some of these pelagic forms back again to assume a fresh littoral existence. The terrestrial fauna has returned some forms to the shores, such as certain shore-birds, seals, and the polar bear; and some of these, such as the whales and a small oceanic insect, *Halobates*,

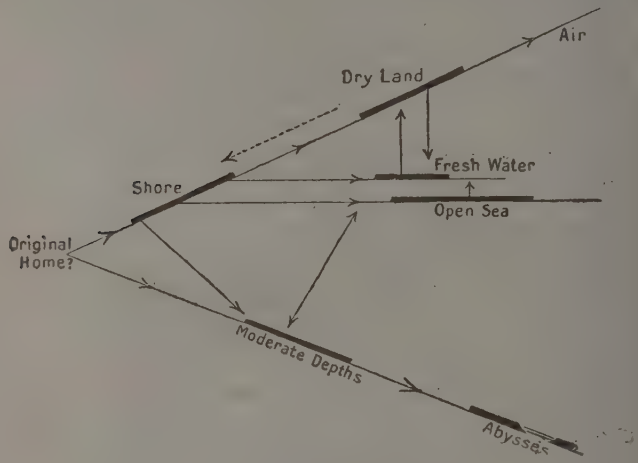

FIG. 46.—*Possible Evolution of Faunas.*

have returned thence to pelagic life." "The deep sea fauna has probably been formed almost entirely from the littoral, not in the most remote antiquity, but only after food, derived from the *débris* of the littoral and terrestrial faunas and floras, became abundant in deep water."

According to Agassiz, Simroth, and others, if we may venture to compress their views into a sentence, a littoral fauna was the original one, whence have been derived, on the one hand, the pelagic and abyssal faunas; on the other hand, those of the fresh waters and dry land.

According to Professor W. K. Brooks, a pelagic fauna was primitive, for there the conditions of life are easiest. From the pelagic fauna migrants passed inwards to the shore and downwards to the deep sea, while a possibility of a return-movement from both these areas is also allowed.

Sir John Murray has especially emphasised the importance of "the d-line," the boundary between the abyssal and littoral (or neritic) gions, at an average depth of about 100 fathoms. It is the line where minute organic and inorganic particles derived from the land and face waters find a resting place upon the bottom, it appears to be one the great feeding-grounds in the ocean, and seems to be very densely pled. The same authority holds "that in early geological times re was a nearly uniform high temperature over the whole surface of globe, and a nearly uniformly distributed fauna and flora; and that h the gradual cooling at the poles, species with pelagic larvæ were led out or forced to migrate towards the tropics, while the great majority the species which were able to survive in the polar areas were those abiting the mud-line."

If we adopt the suggestion that the most probable ancestral home of imals was some region not far from the shore, we may picture the ssible relations in a diagram (Fig. 46) which may appear complex, though probability is that it is not complex enough to be true.

In this brief essay we have of course assumed that conception which is t becoming organic in all thinking—the general conception of evolution, at the present is the child of the past. If this be true, the various faunas d floras amid which the naturalist wanders have had their history, d it is the task—merely begun—of the students of distribution to spell s out.

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CHAPTER IX.—THE PEOPLES OF THE EARTH AND THE DISTRIBUTION OF MANKIND

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Specific Unity of Mankind.—That mankind forms a distinct zoological genus in the strict sense of the term, that is to say, a separate group amongst the higher mammalia sprung from a single stock, though not necessarily from a single pair, may now be taken as a generally accepted conclusion of modern science. There certainly survive here and there a few distinguished polygenists, who still believe that the main divisions have each had a separate origin from so many specifically different ancestors in different parts of the world, although no two of these pluralists are in accord as to the number of such independent zoological species. But this view is rejected by the great majority of living anthropologists, who, after a long period of "storm and stress" in the early part of the nineteenth century, have returned to the sober teachings of Linnæus, in whose Order of *Anthropomorpha* man appears as a single genus with a single species and four varieties, corresponding to the four main continental divisions of the Earth. The *specific*, and not merely the *generic*, unity of mankind is frankly accepted by Sir W. Flower, the leading English anthropologist, in whose Sub-Order of Anthropoidea, the *Hominidæ* constitute the fifth and highest family, coming nearest to, but still independent of, the *Simiidæ*, that is, the four groups of so-called "man-apes"—Gibbon, Orang-Utan, Gorilla, and Chimpanzee.

The Pliocene Precursor.—The apparently impassable gap which, despite many obvious points of resemblance, still separated the human from the simian group, was largely bridged over by the discovery made in 1892, by Dr. Eugene Dubois, of some human remains embedded in the late Pliocene deposits of the Solo river, in Java. These highly fossilised bones of *Pithecanthropus erectis*, as he has been named by the finder, are regarded by the best authorities as undoubtedly human, and the importance of the discovery may be inferred from the fact that the skull holds a position about midway between those of the Chimpanzee and of the Neanderthal, that is, the lowest human cranium previously described. In other words the Javanese "missing link" is as much below the Neanderthal as this is below the normal European. It presents the characters which were anticipated in Pliocene, as compared with Pleistocene man, should his remains ever be discovered. Moreover, it gives a vastly more remote starting-point for the natural history of mankind, and that in the

y region which many eminent palæontologists have pointed to as the obable cradle of the human family.

Tertiary Distribution of Land and Water.—At the time of the spersion, the Indo-African Continent, the existence of which was estab-ned by the geologists of the Indian Geological Survey, still formed almost ntinuous land across the present Indian Ocean, between the Dekkan, dagascar, and South Africa. The shallow inland waters, nowhere ceeding fifty fathoms in depth, had not yet converted to insular masses e Sunda group (Borneo, Sumatra, Java), now separated by narrow annels from the Asiatic mainland. The Australian continent was con-cted with New Guinea, and extended westwards much farther than at esent. New Zealand also occupied a far wider area, while the Funafuti rings leave little doubt that Polynesia itself is an area of compara-ely recent subsidence. In the northern hemisphere Africa was nnected with Europe both across the Strait of Gibraltar, and also at one two other points; Britain still formed part of the mainland, and almost ntinuous land appears to have extended from North-west Europe rough Iceland to Greenland and North America.

The First Migrations.—It is to be borne in mind that the first grations took place unconsciously, much in the same way as did those all the other land faunas. The cranial capacity of the Javanese pre-rsor was not much more than about 950 cubic centimètres, as compared th that of the highest apes (Orang 500), and of the highest human beings uropeans, 1,500 or 1,600). Hence at that time the disparity between n and the lower animals was not nearly so marked as at present. He doubt could walk erect, and possessed a well-developed hand with ich to fashion the rude implements found by Noetling in the neigh-uring Pliocene beds of Indo-China. But in other respects the difference uld not have been great, and, like the other animals, he must have oved about rather by instinct and impulse, in obedience to the sur-unding physical conditions, than of any set purpose. The struggle for stence was also carried on in the same blind way, although in virtue of greater intelligence he had no doubt already acquired a sufficient premacy over his competitors to become the one universal species. Not ly is man the one member of the animal kingdom whose present range incides with that of the habitable globe, but this universal domain had eady been occupied by him in early Pleistocene times. A considerable ass of trustworthy evidence has in recent years been brought together om every quarter of the world to show that it had been peopled during, not prior to, the recurrent invasions of ice in the northern and southern mispheres. That is to say, Pleistocene man had spread over the entire bitable globe while he was physically still but little removed from his ocene ancestor, and prior to the development of any culture, and even any arts or industries, beyond the manufacture of the rudest stone plements. Hence the astonishing resemblance that is presented by

these objects, as well as by the earliest skeletal remains of man himself in whatever part of the Earth they are found—skulls from western and Central Europe, from Egypt, California (if genuine), Brazil and other parts of South America; flints from Britain, France, North and South Africa, Somaliland, India, the United States, Patagonia, Fuegia.

By the land connections indicated above, Pleistocene man was able, without any knowledge of navigation, to pass from his Indo-Malaysian home northwards to Asia and thence by the Bering Strait route into America; and westwards into Africa; thence northwards by two routes (Strait of Gibraltar, Tunis-Sicily) into Europe, and from north-western Europe to Greenland and America during inter-glacial or post-glacial times.

Formation of Varieties.—From this view of the first dispersion it follows that these migrations everywhere preceded the later physical and mental development of mankind, so that the evolution of the existing human varieties and of their several cultures is presented in quite a new light. We need no longer suppose, always a somewhat violent assumption, that some fully specialised group, say, originally black, migrating from continent to continent, became white in one region, yellow in another, brown in a third, and so on. Had such a group passed from its proper zone to another, it would probably have died out long before it had time to become acclimatised. In any case it is now easy to see that the evolution could not have taken place on those lines, but was brought about in the several regions independently, as in the case of other animal varieties. The Pleistocene groups, all alike at first, everywhere presented the same generalised prototype, from which the now living varieties were severally and independently developed. The main divisions of mankind must therefore be regarded, as Linnæus regarded them, as so many zoological varieties, all springing from common or closely allied generalised ancestors, and each gradually specialised by slow adaptation to its special environment. Like all other divisions of the terrestrial fauna, these divisions are thus the outcome of their respective surroundings. They are what climate, soil, diet, heredity and time have made them, and that is the reason why, in the case of all later migrations, the first question that arises is one of acclimatisation. If the new zone is favourable, that is, differs little from the old, the variety persists; if not, it either merges and becomes absorbed in the indigenous element, or else simply dies out. A continuous illustration of this fundamental truth is afforded by the social relations in North America, tropical and extra-tropical Africa, India, Australia, New Zealand, and every other land where European people have failed or succeeded in establishing themselves.

Culture Zones.—With what may be called the first settlement of the Earth by Man in Pleistocene times begins the evolution of the human varieties and of human culture everywhere simultaneously, but with varying results in accordance with the varying nature of the environment. In the most favoured regions, mainly the north temperate zone (the south

mperate being too contracted to constitute areas of specialisation) man as attained his highest development both physically and mentally.

In the eastern hemisphere the space included between the parallels of 5° and 50° N. will about comprise what may be spoken of as the "Culture one" in a pre-eminent sense. Within this privileged area, which, following the normal isothermal curves of continental and marine climates, is ontracted in the east to 40° N. or less, and reaches in the extreme west 55° N., have originated and flourished all the great centres of civilisation ancient and modern times — the Egyptian, Babylonian, Assyrian, ersian, Indian, Chinese, Ægean (Mykenæan), Hellenic, Phœnician, inæan, Sabæan, Etruscan, Roman, and later European. Within the me area have sprung up all the great religions of the world — the ewish, Buddhist, Christian, and Mohammedan ; and here also have been eveloped all the higher orders of speech, that is to say, the three inflecting Hamitic, Semitic, and Aryan linguistic families. Such coincidences e not merely accidental, but have their roots in the soil itself, and are an oquent illustration of the great evolutionary formula that all living ings are the outcome of their environment.

Elsewhere, primitive man has lagged behind, being still for the most art a mere savage in nearly all the tropical, and also, for the reason stated, the south temperate lands—Central and South Africa, East Malaysia, ew Guinea, Australia, Melanesia, Fuegia. The picture is completed by e various transitional phases of barbarism between savagery and vilisation, which are characteristic of the inhabitants of the sub-tropical siatic peninsula, the bleak elevated plateaux and sub-arctic steppes of both emispheres : Indo-China, the Dekkan, Central Arabia, Tibet, Mongolia, beria, the great tablelands, prairies, and tundras of the New World.

The diverse anthropogeographical relations here sketched in broad ıtline have no doubt been somewhat modified, and in places completely bliterated, since the expansion of the higher European peoples during the st four hundred years. But a properly prepared sixteenth century ılture-map of the world on a Mercator projection would show a nearly ırallel series of shaded bands, indicating the various degrees of progress ade by mankind since the Pleistocene period between the equatorial, the rctic, and antarctic regions. Owing to the contraction and great elevaon of the land about the equator in the western hemisphere, the chief ocultural deflections occur in the New World, not in the temperate zone, ıt well within the tropics (Peru, Colombia, and Yucatan). Mexico alone eached northwards a little beyond the tropic of Cancer.

The Progressive Stages of Culture.—The progressive stages of ıman culture, viewed as a whole, are determined, partly by the activities dispensable to mere existence—hunting, fishing, pasture, and tillage—but r more by the industries associated either with those activities themlves, or with more advanced social conditions. By a systematic study the remains of the more primitive and later arts, discovered in ever in-

creasing abundance in all parts of the world, archæologists have been able to distinguish certain marked types of stone, and later of metal implements, which everywhere present a surprising general uniformity, and thus serve as a sure guide in following the successive steps by which mankind has advanced from the lowest to the highest plane of civilisation.

The Old and New Stone Ages.—Thus have been determined a *Palæolithic* and a *Neolithic*, that is, an "Old Stone" and a "New Stone" Age, with reference to the material (mostly flint) which in the first, and immeasurably the longer, period, was merely chipped, flaked, or otherwise rudely fashioned, but in the second more carefully worked and polished. Now, it is an ascertained fact that some of the highly specialised varieties of Man known to history—Proto-Hamites, Proto-Semites, Iberians, Ligurians, Pelasgians, and some peoples of Aryan speech—had already made their appearance in Neolithic times both in Central and West Europe, and in all the Mediterranean lands eastward to Mesopotamia. Consequently, the Old Stone Age must have lasted long enough to allow of such stupendous differentiations as those involved in the upward development from the Pleistocene precursor to Linnæus' *Homo Europæus*. It is not, therefore, perhaps surprising that even such a cautious observer as Sir John Evans should have declared that "the remoteness of the date at which the Palæolithic period had its beginning almost transcends our power of imagination."

During these countless ages, estimated by some authorities at several hundred thousand years, the various Pleistocene groups could nowhere have remained stationary, and in the more favoured localities the progress was so great that it is not everywhere possible to draw a hard and fast line between the Old and the New Stone periods. Speaking generally, however, the latter was distinguished from the former by a more complete control over fire, by burial and funeral rites associated with more enlarged religious notions, by the cultivation of cereals and other alimentary plants, by the domestication of several animals, and by considerable progress in most of the useful arts and industries, especially pottery, weaving, architecture. Some of the monuments raised by Neolithic man over the dead—dolmens, menhirs, barrows—were so solidly constructed that they are still found girdling the globe from Britain and Brittany through Iberia, North Africa, Syria, Palestine, India, Korea, Japan, Easter and many other Pacific islands to the New World, where they culminated in the astounding monoliths of Tiahuanaco on the southern shore of Lake Titicaca. They served as models for later generations, as in Etruria, Mykenæ, Phœnicia, Egypt, where the pyramids themselves are nothing but petrified mounds. Thus are connected remote past and present times by the imperishable works of early man, just as the two Stone Ages were connected by the kitchen middens and shell mounds which were common to both periods, and are still found fringing the "beachèd margent of the sea" in so many lands—Denmark, Japan, Australia, North and South America.

Similarly, the present aquatic habitations of savage man in such widely

eparated regions as Cambodia, New Guinea, Borneo, Venezuela, have their rototypes in the lacustrine pile-dwellings, *terramare*, *palafitti*, crannogs, nd other Neolithic stations, whose sites have been explored in Switzerland, orthern Italy, Ireland and Scotland. North Britain appears to have been rst occupied by these crannog-dwellers, or possibly by some earlier eolithic hordes, in places where subsequent geological changes afford me trustworthy data wherewith to gauge the long duration of the second one Age. Thus, after the break of continuity between Britain and urope in glacial times, Sir W. Turner suggests another upheaval, a Neolithic land-bridge," by which the men of the New Stone Age may ave reached Scotland, where they were undoubtedly present during the rmation of the Carse clays. These cliffs, which show distinct traces of a-beaches now in places 45, 50, and 100 feet above the present sea-level, rmed the bed of a marine inlet, which in post-glacial times still nearly if ot completely separated North Britain from the region south of the Forth. he rise of the 100 foot terrace was followed by an immense development forest growths, which have since disappeared, and all these oscillations nd surface changes fall within the relatively short New Stone period.

The Metal Ages.—Then followed, still in remote times, the introuction of the metals, which, generally replacing stone, constituted the ree "Copper," "Bronze," and "Iron" Ages, in the order named, but ithout any further absolute displacements. These metals, once made nown, have necessarily persisted for diverse purposes throughout the ext ensuing "Prehistoric" and "Historic" Ages down to the present me. Here, indeed, there can be no real dividing lines, and, as shown by he multifarious contents of prehistoric graves, overlappings were of conant occurrence, while the transitions from period to period must everyhere have been imperceptible. In fact, a clearly marked Copper Age as been doubted except in the New World, where, before the disovery, bronze was but little known, and iron (other than meteoric) not at all.

The Prehistoric and Historic Ages.—The Prehistoric Age, which dmits of no strict definition, covers that vague period of time, dim emories of which, such as popular myths and legends, demi-gods, eponyous heroes, and the like, survived into the strictly Historic Age. It correponds to the "Age of the Five Emperors," in the early Chinese records, hich was marked by the institution of marriage and the invention of riting, and was preceded by the "Age of the Three Rulers," our Stone ges, when people dwelt in caves, drank the blood of animals, ate wild uits or uncooked food, wore the skins of animals, obtained fire by friction, nd threw their dead to the beasts of prey. Such universal reminiscences eveal the common background of shere savagery which stands behind the ter developments among all the more or less cultured peoples.

Of the Historic Age, which must persist to the end of time, the essential haracteristic is the general use of letters, invented in the West as well as in

China in the Prehistoric Age, if not even earlier.[1] In virtue of this invention, gradually perfected through the successive phases of mere pictographs, conventional ideographs, phonetic symbols, syllabaries, and alphabets, all human knowledge worthy of preservation is perpetuated, and thus becomes accumulative.

Civilised Man.—Henceforth the mind grows, so to say, at the expense of the body; man becomes less and less a mere "creature of circumstances," that is, more independent of his environment, which he now largely controls; and as he began by acquiring the ascendancy over all the other members of the animal kingdom, and constituting himself the one universal species, so he ends by bending Nature herself to his will and requirements. By the development of navigation and diverse methods of land locomotion, he has been able to overcome the obstacles of seas and mountain barriers, and thus to move more freely over the face of the Earth. But these processes have been in progress for many millenniums, certainly since late Neolithic times, with the result that the originally well marked varietal groups have become almost everywhere somewhat intermingled, and their distinctive physical characters diversely modified. Thus it is that the primitive racial types have become "ideal quantities," and the original races themselves palæontological studies, while "the more limited groups, now called races, are nothing but peoples, or societies of peoples, brethren by civilisation more than by blood" (Tosti).

Primary Divisions of Mankind.—Under these circumstances it is not surprising that opinions have greatly differed regarding the number and nomenclature even of the primary divisions of mankind, although here again the tendency has lately been to revert to the views of the Swedish systematist. There is a somewhat general consensus amongst ethnologists that the endless sub-varieties may be reduced to about four primary groups —the *Ethiopic* or *Negro*, the *Mongolic* or *Yellow*, the *American* or *Red* and the *Caucasic* or *White*, the term "Caucasic" being of course taken in Blumenbach's purely conventional sense, without any special reference to the inhabitants of the Caucasus. This scheme has the advantage of being based partly on colour, one of the most conspicuous external characters, and partly, as it ought to be, on actual geographical distribution, with no doubt certain discrepancies in both cases. Thus, before the displacements that have taken place in modern times, the *Ethiopic* was mainly confined to the inter-tropical lands west and east of the Indian Ocean (Africa south of the Sahara, and most of Australasia), which jointly constitute the essentially Negro or Black Zone. The *Mongolic* occupies by far the greater part of Asia with some conterminous European districts, and is almost everywhere characterised by various shades of yellow, or yellowish brown, so that in popular language, "Yellow Mongol" and "Asiatic" are practically equiva-

[1] M. Cartailhac describes certain markings on pebbles from the Mas d'Azil cave, which he regards as possibly a rudimentary script dating from the Stone Ages (*L'Anthropologie*, 1896, p. 385 *sq.*).

t expressions. Thanks to its insular conformation, the coincidence of e New World with the *American* division is complete, and here again ldish or coppery tints prevail from Alaska to Fuegia. Lastly, the *Caucasic* mprises nearly the whole of Europe and Africa south to the tropic of ncer, with the eastern seaboard to the equator and south-western Asia. is division thus occupies a very distinct zoological zone, disposed und about the Mediterranean waters where the dominant colours are hite and whitish or olive brown, with some aberrant deep brown, or en black shades in those districts where this division encroaches on e Black Zone. These dark Caucasic groups (Gallas, Somalis, Abys-ians), are, so to say, balanced by those Mongolic peoples (Finns, Lapps, rks, Bulgars, Magyars), who have invaded the Caucasic zone, and thus come assimilated in colour and other respects to the white type. All ch aberrations are to be regarded as results of the secular interminglings at have everywhere taken place about the ethnical "divides" of the imary groups.

Each of these groups comprises a number of sub-varieties which are fficiently specialised in type, speech and other respects to constitute erably well-defined secondary divisions. A summary conspectus of ese groups and sub-groups, disposed according to their more probable netic affinities, is all that it is possible to give in this place.

HE CHIEF DIVISIONS AND SUB-DIVISIONS OF MANKIND.

ETHIOPIC (BLACK) DIVISION.

I.—WESTERN (AFRICAN) SECTION.

riginal Habitat.—Africa south of the Sahara ; Madagascar.

ater Expansion.—North Africa (sparsely) ; Southern United States ; Nicaragua ; West Indies ; Atlantic States of Brazil ; the Guianas.

opulation.—Africa, 150,000,000 (?) ; Madagascar, 3,000,000 ; Tropical and Sub-tropical America, 20,000,000. Total, 173,000,000.

hysical Characters.—*Head :* Long (from glabella to occiput) ; prognathous jaws ; broad flat nose ; thick everted lips ; rather prominent cheek bones ; arched brow ; large, round, prominent black eyes, with yellowish cornea ; flat foot ; larkspur heel.

Colour : Very deep brown, rarely quite black.

Hair : Short, black, woolly, flat in cross section ; sparse beard.

Height, above the average : 5 feet 8 inches to 6 feet.

Iental Characters.—*Temperament :* Sensuous, unintellectual, fitful ; mind arrested at puberty, hence unprogressive ; no science or letters ; few arts beyond agriculture, weaving, pottery, woodwork, and metallurgy (iron and copper).

Religion : Nature and ancestry worship ; fetishism ; witch-craft ; human sacrifice ; ordeals.

Speech : Agglutinating, mostly with prefixes ; numerous stock languages north of the equator ; two only in the south (Bantu and Hottentot), Malayo-Polynesian in Madagascar.

Chief Sub-Divisions.—*Wolof, Mandingo, Songhay,* West Sudan; *Chi, Ewe, Yoruba,* Upper Guinea; *Hausa, Bornu,* Central Sudan; *Maba, Nuba, Denka, Shilluk, Bari,* East Sudan and White Nile; *Niam-Niam* (*Zandeh*), *Mangbattu, Barambo, Momfu,* Welle river. Groups of Bantu Speech: *Waganda, Wanyoro,* Lakes Victoria and Albert; *Waswahili,* East Coast; *Zulu-Kafir,* South-East Coast; *Bechuana, Mashona, Marotse,* South-Central regions; *Ova-Herero, Ova-Mpo, Bateke, Mpongwe,* West Coast.

Aberrant and Doubtful Groups.—*Fula,* Senegambia, Sudan.

Fans, Ogowe and Gabun basins; Bantu speech, negroid type with marked Hamitic traits; Pagans.

Negritoes, numerous isolated groups in the forest regions of the Congo basin; negro features, brachycephalous heads; yellowish colour; dwarfs, 3 feet 6 inches to 4 feet 10 inches.

Bushmen, originally everywhere south of Lake Tanganyika, now mainly in the Kalahari desert, probably akin to the Negritoes.

Hottentots, orginally everywhere south of Zambezi, now confined to Cape Colony and Namaqualand; of Bushman-Bantu descent.

II.—EASTERN (AUSTRALASIAN) SECTION.

Original Habitat.—Malaysia; Andamans; Philippines; New Guinea; most of Polynesia; New Zealand; Australia; Tasmania.

Present Domain.—Malaysia, east of Flores; Malay Peninsula, Andamans, parts of the Philippines, Melanesia, parts of Australia.

Population.—2,000,000, chiefly in New Guinea and Melanesia.

Physical Characters.—Very variable, differing from the African section chiefly in the height, which is about or even below the average; the hair, rather frizzly, wavy, or shaggy (Australia) than woolly; the nose, large, straight, and often aquiline with downward tip; and the lips less thick and never everted.

Mental Characters.—*Temperament:* Boisterous, cruel, treacherous, indolent; generally more savage than the African; head-hunting common in Melanesia; cannibalism formerly prevalent as in Africa; no science, letters, or arts, except agriculture, pottery, weaving, and woodwork; artistic sense somewhat developed, as shown especially in boat-building and wood-carving.

Religion: Nature and spirit worship, totemism; tabu.

Speech: Archaic forms of Malayo-Polynesian in Melanesia; agglutinative with post-fixes in Australia and most of New Guinea.

Sub-Sections.—*Papuans,* the most typical of the Oceanic negroes. Range: Most of East Malaysia, inclusive of Flores; nearly all New Guinea.

Melanesians.—Often grouped with the Papuans; but differences physical, mental, and linguistic, constitute them a separate branch. Range: New Britain and New Ireland; Louisiades; Solomons; New Hebrides, New Caledonia and Loyalty; Tasmania (now extinct).

Australians.—A highly specialised branch, with marked uniformity in type, speech, and usages throughout Australia; disappearing.

Negritoes.—Andamanese, the so-called "Mincopies," Andaman Islands; *Samangs, Sakais,* of Malay Peninsula; *Aëtas,* thinly scattered over the Philippines.

MONGOLIC (YELLOW) DIVISION.

iginal Habi'at.—Probably the Tibetan tableland.

irly Expansion.—Indo-China ; China ; North Asia ; Malaysia.

esent Expansion.—Korea ; Japan ; Formosa ; Turkestan ; Irania ; Asia Minor ; Caucasia ; Russia ; Baltic lands ; Balkan Peninsula ; Hungary ; Madagascar ; Australia ; America.

pulation.—China, 380,000,000 ; Japan and Korea, 55,000,000 ; Indo-China, 35,000,000 ; Malaysia, 30,000,000 ; Mongolia and Manchuria, 10,000,000 ; Tibet, 6,000,000 ; Turkestan and Siberia, 7,000,000 ; West Asia, 13,000,000 ; Sundries, 4,000,000. Total, 540,000,000.

ysical Characters.—*Head* : Brachycephalous, moderately prognathous jaws ; very small concave nose ; thin lips ; prominent cheek bones ; small oblique black eyes.

Colour : Yellowish, pale, or white in Manchuria, Korea, Japan, and in Turkey and Russia ; yellowish brown in Malaysia.

Hair : Long, coarse, and black, round in cross section, no beard.

Height : Below the average, 5 feet 2 to 4 or 6 inches.

ental Characters.—*Temperament :* Sluggish, sullen, industrious in the temperate zone, elsewhere in dolent ; mostly reckless gamblers ; science slightly, arts and letters moderately developed.

Religion : Nominal Buddhists and Mohammedans mostly ; a few pagans and Shamanists ; nearly all spirit worshippers.

Speech : Three great families : 1. URAL-ALTAIC, Lapland to Japan, Turkestan to Hungary ; agglutinating with post-fixes. 2. TIBETO-INDO-CHINESE, Tibet to the Pacific, Great Wall to Indian Ocean ; originally agglutinating, now in every transition of phonetic decay towards monosyllabism, with numerous homophones distinguished by *tone ;* hence may be called "monosyllabic toned languages." 3. MALAYO-POLYNESIAN, the "Oceanic" linguistic family in a pre-eminent sense, sweeping round from Madagascar across the Indian and Pacific Oceans to Easter Island, and from Hawaii to New Zealand ; agglutinative at various grades of dissolution.

bdivisions and Aberrant or Doubtful Groups : *Mongolo-Turks.*—Commonly called "Mongolo-Tartars." Chief sub-groups : MONGOLS proper : *Khalka* or *Shara, i.e., Eastern Mongols ; Kalmuks, i.e., Western Mongols ; Buriats,* Siberian Mongols ; *Tungus ; Manchus, Gilyaks.* Range : Mongolia, Manchuria, North Tibet, most of East Siberia. TURKI BRANCH : *Yakuts, Kirghiz, Uzbegs, Turkomans, Nogai, Anatolian Turks, Osmanli.* Range : Lena Basin. Central and West Siberia, Turkestan, Asia Minor, parts of Caucasia, East Russia and Rumelia.

Ugro-Finns, Samoyedes, Lapps ; Finns proper, *Voguls, Ostyaks, Siryanians, Permians, Magyars, Bulgars.* Range : North Siberia and islands east to the Yenisei, Lapland, Finland, Esthonia, Livonia, parts of North and East Russia, Hungary.

Tibeto-Chinese.—Tibetans, Burmese, Shans (*Siamese, Ahoms, Khamti*), *Arakanese, Chins, Nagas, Mishmi, Annamese, Chinese.* Range : Tibet, Himalayan slopes, most of Indo-China and China.

Malayans.—Malays proper, Sundanese, Javanese, Balinese, Sassaks, Bugis, Bisayans, Tagals, Formosans, Hovas. Range : Malaysia, east to Flores, Formosa, Philippines, parts of Madagascar.

Koreo-Japanese.—Koreans, Japanese, Luchu Islanders.

Sub-Arctic.—Chukchi, Koryaks, Yukaghirs, Kamchadales.

AMERICAN ("RED") DIVISION.

Original Habitat.—The whole of the New World.

Present Restricted Domain.—The unsettled parts and some reserves in the Dominion; Alaska, numerous reserves and some north and south-west tracts in the United States; most of Mexico, Central and South America, partly intermingled with the White and Black intruders, partly still independent or in the tribal state.

Population (pure and mixed).—Full blood, 9,900,000; half-breeds, 12,270,000; total, 22,170,000, chiefly in Mexico (8,765,000), Brazil (4,200,000), Colombia (3,150,000), Peru (2,700,000), Bolivia (1,500,000), Guatemala (1,400,000), and Venezuela (1,325,000); in the United States only 250,000, and Canada 100,000.

Physical Characters.—*Head:* Both round and long, intermingled inextricably; slightly projecting massive jaws; large straight or aquiline nose; moderately prominent cheek bones; small straight black eyes; coppery colour, shading off to yellowish or brown.

Hair: Like the Mongol, but longer and coarser; scant beard.

Height: Variable, average or under on the uplands, above the average on the plains (Patagonia, pampas, prairies).

Altogether a type specialised in the New World, probably from generalised Asiatic (pre-Mongol) and European (pre-Caucasic) precursors, the former predominating.

Mental Characters.—*Temperament:* Austere, moody, impassive, wary; science slightly, art and letters moderately developed.

Religion: Polytheistic, with human sacrifices where most developed (Aztecs, Mayas); elsewhere nature worship and shamanism.

Speech: Multifarious, but everywhere of the same *polysynthetic* type, in which the elements of the sentence tend to merge in a single word sometimes of prodigious length. Being unknown in the Old World, this type must have been entirely developed in America from the common germs of articulate speech which accompanied Pleistocene man in all his migrations. There are probably over 200 stock languages of this character, crowded together in astonishing numbers in some coast districts (Oregon, British Columbia, California), and woodlands (Amazonas), but some ranging over vast spaces on the open plains and plateaux.

Chief Subdivisions.—*Eskimo.*—Most specialised of all the aborigines; range for 5,000 miles from Alaska round the Arctic shores to Greenland and Labrador.

Athapascan.—Kuchins, Chippewyans, Apaches, Navajos; Alaska to Hudson Bay with enclaves on west coast and about United States and Mexican frontiers.

Shoshonean.—Snake family: *Bannocks, Comanches, Utes, Moqui.* Range: Oregon to Texas, Idaho to South California and Arizona.

Siouan.—Dakotas, Assiniboines, Omahas, Crows, Iowas, Missouri, Catawba (extinct). Range: Hudson Bay to Arkansas; Virginia, North and South Carolina.

Muskhogean.—Creek family: *Creeks, Choctaws, Seminoles, Chicasas.* Range: Kentucky to Florida.

Algonquian.—Delawares, Ojibwas, Shawnees, Arapahoes, Crees, Blackfeet, and many others. Range: Rocky Mountains to Newfoundland, Labrador to Kentucky.

Iroquoian.—Hurons, Cherokees, Tuscaroras, Mohawks, Senecas, Cayugas, Onondagas, Oneidas. Range: Laurentian Basin, New York, Pennsylvania, Michigan.

Nahuatlan.—Aztecs, Pipils, Niquirans. Range : Mexico discontinuously to Nicaragua.

Huaxtecan.—Huaxtecs, Mayas, Quichés, Pocomans. Range : Vera Cruz, Yucatan, Guatemala.

Muiscan ; Arawakan ; Araucan , Tsonecan.

Cariban.—Caribs, Macusi, Ackawoi, Bakairi. Range : Central Brazil to West Indies (a few still in St. Vincent).

Quechuan. — Quiteños, Peruvians, Aymaras, Chinchasuyos. Range : Quito to Lake Titicaca and Chili.

Guaranian.—Guarani-Tupi family. Range : A great part of Brazil and Paraguay.

CAUCASIC (WHITE) DIVISION.

iginal Habitat.—North Africa, south to Sudan.

irly Expansion.—All the Mediterranean lands ; North-East Africa ; Arabia ; Central and West Europe ; Britain ; Irania ; India ; South-East Asia ; Malaysia ; Polynesia ; North-East Asia.

ter and Present Expansion.—The whole of Europe ; Aralo-Caspian Depression ; East Turkestan ; Manchuria ; Korea ; Japan ; North Africa (return) ; Abyssinia ; South Africa ; North and South America ; Australia ; New Zealand.

opulation.—Europe, 355,000,000 ; Asia, 280,000,000 ; America, 115,000,000 ; Africa, 15,000,000 ; Australasia, 5,000,000. Total, 770,000,000.

ysical Characters.—Two types : 1. Fair (Huxley's "Xanthochroi"). *Head :* long ; moderately large blue or grey and straight eyes. *Colour :* Florid. *Hair :* Long, wavy, flaxen, light brown and red. *Height :* Above the average (5 feet 6 inches to 6 feet). 2. Dark (Huxley's "Melanchroi"). *Head :* Long in south, round in north ; large black eyes. *Colour :* Pale white. *Hair :* Wavy, curly, brown and black. Jaws of both orthognathous ; nose large, straight or aquiline ; cheek bones small, features regular.

ental Characters.—*Temperament* of 1 : Solid and somewhat stolid ; of 2 : Fiery, fickle ; of both : Active, enterprising, imaginative. Science, arts, and letters highly developed.

Religion : Monotheistic (Judaism, Christianity, Mohammedanism), but polytheistic (Brahmanism, &c.) in India and elsewhere.

Speech : Mainly inflecting (*i.e.*, root and formative elements completely fused), but agglutinative in Caucasia, the Dekkan, and Polynesia. Two great linguistic families : *Hamito-Ibero-Semitic*, North Africa, South-West Asia, Iberia ; *Aryan* (*Indo-European*), nearly all Europe, Armenia, Irania, Northern India, nearly the whole of America, Australia, New Zealand, parts of North and South Africa.

ief Subdivisions :—South Mediterranean.—*Hamites :* Berbers, Tuaregs, Egyptians, Bejas, Afars, Agaus, Gallas, Somalis, Tibus, Masai, Wa-Huma. Range : Mauritania, Sahara, Nile Basin, North-East African seaboard. *Semites :* Arabs, Abyssinians, Syrians, Chaldæans. Range : North Africa, Abyssinia, Arabia, Syria, Mesopotamia.

North Mediterranean. — *Pelasgo-Hellenes :* Albanians, Greeks. Range : Adriatic to Cyprus and Asia Minor, Rumelia to Crete. *Ligurians :* Most Italians, Corsicans, Sards, Sicilians. *Kelto-Iberians :* Spaniards, Portuguese, Basques, Bretons, Auvergnats,

Savoyards, some English, many Welsh and Irish. Range: North Italy, South France, Brittany, parts of England and Scotland, most of Wales and Ireland.

North European.—*Scandinavians:* Icelanders, Norwegians, Swedes, Danes, Orkney, Shetland and Faroe Islanders. *Low Germans:* Most Prussians and Westphalians, Frisians, Dutch, Flemings, English, Scots, many Irish. *High Germans:* Bavarians, Wurtembergers, Tyrolese, most Swiss, Austrians. *Letto-Slavs:* Lithuanians, Great, Little and White Russians, Poles, Chechs (Bohemians and Moravians), Slovenes, Slovaks, Croatians, Serbs, Dalmatians, Montenegrins.

Iranic.—Armenians, Kurds, Persians, Afghans, Baluchi. Range: From Asia Minor to Indus, Hindu-Kush and Pamir slopes.

Indic.—*Northern Hindus* (of Aryan speech): Kashmiri, Panjábi, Sindhi, Bengali, Hindi, Gujaráti, Mahrati, Oriya, Assami. *Southern Hindus* (of Dravidian speech): Telugus, Tamils, Kanarese, Malayalims, Singhalese, some Galchas.

Indonesian.—*Asiatic Mainland:* Gyarungs, Lolos, Mossos, Kuys, Khmers (Cambodians), Charays. *Malaysia:* Battas, Tinguians, Manobas. *Polynesia:* Samoans, Tahitians, Tongans, Maori, Marquesas, Hawaiians.

Ainu.—South Kurile Islands, Yezo, South Sakhalin.

Caucasian Proper.—Georgians, Lazes, Circassians, Abkhasians, Kabards, Chechenzes, Lesghians; both slopes of Caucasus.

Population of the World According to Races.—From this survey it appears that since Neolithic times the two lower groups (Ethiopic, American) have been losing, the two upper (Mongolic, Caucasic) gaining ground everywhere, with results expressed in terms of population as under :—

Caucasians	770,000,000
Mongols	540,000,000
Ethiopians	175,000,000
Americans	22,000,000
Total ...	1,507,000,000

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CHAPTER X.—POLITICAL AND APPLIED GEOGRAPHY

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Political Geography.—The body of knowledge included under the rm Geography is capable, like most other departments of science, of rtain practical applications to the affairs of humanity. But until the ıdent has thoroughly grasped the facts and principles of physical ography and of anthropogeography, he is not in a position to investigate eir practical applications with success. Political geography is the plication of the data included in these two great divisions of the subject the affairs of those groups or communities of men which in their more veloped condition we designate States or Nations. Groups of this class e of all grades from the isolated village community and the nomad tribe savages, up to one of the "Great Powers"; but whatever its grade, is impossible to conceive of any community without associating it with area of land or territory of greater or less dimensions. The land and e people are integral parts of the State or political community, the one ing as indispensable as the other, and therefore a knowledge of both absolutely essential to a satisfactory understanding of the life and tivity of the State.

It may be said that the whole of geography has a practical bearing in s direction, as it deals with the surface of that Earth, which is the theatre all human activity. We can here only briefly indicate some of the rections in which this practical application can be worked out.

Position on the Earth's Surface.—The position of a country on e Earth's surface is determined by latitude and longitude. The former, ɔm the standpoint of Political Geography, is of much more importance ın the latter. Latitude is one of the main factors in the determination climate. Land in the extreme north or the extreme south is either inhabitable, or political, social and industrial development is arrested on count of the cold. Extreme heat, with certain modifications, seems also exercise an arresting influence. But in considering the political velopment of tropical regions, we must take into account the type of ople inhabiting them. How far the geographical environment has ɔulded the character of the people, it is the business of Anthropo- ography to investigate. At this stage of the world's history, the portant point with regard to tropical countries is to what extent they e habitable by the white races, by the dominant peoples who have been

habituated to temperate climates. Hitherto, in India and in tropical Africa, the white races have not been able to people the countries, but only to reside temporarily as traders or as rulers of the native population. In tropical countries, as a rule, the necessaries of life can be obtained without much exertion, and as little or no clothing is required, the incentives to exertion for a people in a primitive state are few. The great advances in civilisation, in political, social, and industrial development, have been made in temperate climates.

Longitude, as indicating the position of a State on a great continent, is of importance, as distance from the sea-board has an effect in modifying climate. It is also of commercial and even political importance with respect to communications and distance from important seaports.

Physical Characteristics.—The surface forms or Physical Characteristics of a country, its division into mountains and valleys, into high plains or plateaux, and low plains, the distribution of land and water, the nature of the soil, must evidently have a marked effect on the political and industrial development of a country. A mountainous country like Switzerland or Abyssinia, or a high plateau country like Tibet, presents very different conditions from the well-watered plain of northern Germany, the black earth region of Russia, or the prairies of North America. The highlands of Scotland have reared a different type of people, have had a different history, and a different development from the lowlands, and from the great plain and the uplands of England. These, again, present marked contrasts with the conditions of life and the history of the Sahara and the desert of central Australia. An island State, like Great Britain, is influenced by a different set of conditions from those which prevail on a continental State with contiguous neighbours. The configuration of a coast-line is another important factor in influencing the development of a country. It may be rich in bays and gulfs and estuaries, and fjords forming excellent harbours and giving easy access to shipping, as in the case of Europe, or it may be marked by an entire absence of such advantages, as in the case of Africa, the greater part of the coast of which cannot be approached by shipping, and which, except in the case of the Congo estuary, has no indentations going deep into the land. But it should be pointed out that modern engineering skill has been able to overcome some of these disadvantages, and to create a new set of geographical conditions.

Mountains may play an important part in modifying the distribution of rainfall over a country, depending on the aspect they present to the prevailing winds. Their direction may be such as to tap the rain-bearing winds and distribute the precipitation in a direction from which little or no agricultural results could be expected. The Himalayas intercept the rains of the southern monsoon before they can reach the Tibetan plateau beyond; therefore we find on one side rich forest and other vegetation and on the other sterility. The waterless condition of the Sahara is no

bt partly due to the direction and the situation of the Atlas range, ch intercepts what moisture comes from the Atlantic and Mediterra- n. So it is in Australia, the main mountain ranges of which are on the ern border. Altitude in general is a great modifier of climate ; if of ficient dimensions it may introduce temperate climates into a tropical ntry, as in some parts of Africa and South America.

The *Hydrography* of a country, that is, the distribution of its water- ply on the surface, is evidently a matter of prime importance. The n forms in which water is found on the Earth's surface, apart from the an, are those of lakes and rivers. Under certain conditions the supply water stored underground may also be of economical value, as in the ara and Australia. A widespread network of rivers, as in England and r much of Europe, gives a State a great advantage in the development he agricultural resources of the soil. On the other hand although a very ge area of Australia is waterless, yet by sinking wells a supply of water been obtained in some districts sufficient to irrigate an extensive area l so turn a desert into valuable grass lands for cattle and sheep. It is en possible when the beds of streams are steep, or when they are ken by waterfalls, to utilise them as sources of power for machinery tead of steam. Thus it comes that in countries like Switzerland and rway electric lighting is common even in small villages, while Niagara ls supply power to innumerable factories both on the Canadian and the ited States side.

Lakes are also of some importance in these respects, and that im- tance is increased when their stores of water can be distributed ier by rivers or by canals, for purposes of fertilisation, for industrial s, or for the water supply of large towns. Both rivers and lakes, when considerable size, and especially when supplemented by canals, may be great utility as means of communication or transport. They were of l more importance before the extension of railways.

Dimensions.—This element, composed of length, breadth, altitude l area, has various important bearings on the life of a community or State. e extent of a country from north to south may be of prime significance. nada extends from the latitude of Lisbon to the Arctic regions, the ult being that a large area in the north is unavailable. Even the United tes has during the course of the year a climate varying from tropical t to Arctic rigour. These two countries in the east and west direction end from the Atlantic to the Pacific Oceans, so that while their east sts, owing to certain physical conditions, have a severe, and, in the case Canada, an Arctic winter, their west coasts have a comparatively mild nate. The British possessions in South Africa extend from the tempe- e climate of Cape Colony to the tropical conditions of Lake Tanganyika ; s gives a great advantage over a purely tropical country so far as ropeans are concerned. Similar conditions are found in Australia.

Area is of importance in many ways. A State of very small extent is

not necessarily an inferior Power. The actual areas of Athens and Sparta, of Phœnicia and Carthage, and even of Rome were comparatively insignificant, but these were all of them Great Powers in their time. In the middle ages Venice and Genoa were insignificant in size, but they exercised great influence owing to their commercial supremacy. The Hanseatic League may be said to have had no territory at all, but here again the magnitude of its commercial transactions gave it great influence in the affairs of Europe. The United Kingdom is only half the size of France or of Germany. But its geographical position has given it great commercial advantages, and these combined with its mineral resources, have endowed it with wealth sufficient to maintain a powerful fleet by means of which it has been enabled to acquire and maintain additional territory in other parts of the world. Unless a continental State is of considerable extent, although it may become commercially important, as in the case of Norway, Belgium, Holland, it can never develop into a Great Power, as the population could never increase sufficiently to admit of the establishment of a great army. On the other hand an extensive territory, bordering on the territories of other States, or scattered in sections over the globe, is vulnerable at many points, necessitating the maintenance of a large army or navy, or both, and the establishment of extensive frontier defences.

Boundaries.—"Landmarks" have been a very early institution. Natural boundaries, that is, the boundaries that exist between different types of natural features, are rarely hard and fast lines. Thus the boundary between sea and land is a more or less broad strip. So also there is generally a zone of transition between mountain and valley, between forest and grass land, between the nevé and the glacier, between the river and its banks. Human races also are seldom sharply separated in their habitat, there is always a certain amount of intermingling on the border. Among certain primitive peoples there is no hard and fast line delimiting their territories; in central Africa certain of the native States seem to be separated by a neutral zone. So is it also among certain of the coast tribes of British New Guinea. Until quite recent years there was a broad neutral zone separating China and Korea. In mediæval Europe the "Mark," the "Marches," the "Borders," consisted of a more or less broad belt, it might be a mountain range or a clearing in a forest or a strip of waste land which separated two tribes, or communities, or States. Where there is a scanty nomad or primitive population the need for rigid boundaries is not felt. Natural features at first sight seem to form the most suitable boundaries—a river, a mountain range, a lake, a desert, the ocean itself, and in more primitive times when the Earth was not so fully peopled, no doubt this was so. But as a matter of fact, most of the great rivers are now included in single States; as a result of the Franco-German War of 1871 the Rhine ceased to be the boundary between France and Germany, and became throughout its middle course a German river. With the growth of States, the growing supremacy of a few "Great

owers," the increase of population, the development of commerce and dustry, and the growth of naval and military power, natural geographical undaries have been overridden, especially in Europe and Asia. A State like a living organism which as it grows in strength must expand. xpanding Prussia was bound to find an outlet to the ocean, and so in 66 made her boundaries overlap Schleswig-Holstein. A great State like ussia could clearly not be debarred access to ports open all the year und, and therefore her pushing outward to the Pacific was inevitable. great commercial country must have an accessible sea-board, and if she nnot obtain one by diplomacy, she must endeavour to get one by force.

Ignorance of geographical facts sometimes leads to strange mistakes hich may be to the disadvantage of one of the parties to a boundary eaty. Thus when the boundary tween the United States and nada was arranged in 1846, the e was to proceed across the Lake the Woods to the north-west rner, and then follow the forty-ith parallel. It was afterwards und that the lake extended far the north of 49°, so that the ited States in this way ob-ned a section of territory within nada, and the islands in the e are divided in the most cap-ious way. Boundaries are nerally made at first on paper th the aid of maps, and when e final delimitation is made on e spot, the imperfections of the aps used sometimes gives rise serious disputes, as has been the case in delineating the frontiers tween Russian and British territory in Asia, and between some of e European Powers in Africa. As a rule in settled countries boundaries e arranged between two contiguous Powers, either by diplomacy, purchase, or by war. But in regions occupied by uncivilised or mi-civilised peoples, which civilised Powers desire to annex in whole in part, there may be several parties to a boundary, and these may or y not include the natives themselves. Thus the boundaries of what is own as British East Africa were arranged between Great Britain, rmany and Italy, the native population having no voice in the matter. t to this arrangement France did not formally give her consent, and at e time considered herself at liberty to ignore the boundary line on the st, and to lay claims to a position on the Upper Nile.

FIG. 47.—*Boundary between the United States and Canada at the Lake of the Woods.*

The most uncompromising type of boundary is the ocean; hence the

advantage which the United Kingdom has over continental States. Ow to the nature of the boundaries of the United Kingdom, she is enabled dispense with a large standing army, but is compelled to maintai powerful fleet. The United States and Canada have also the advanta of being bounded on two sides by the ocean, each of them having 6 two land frontiers, differing in this respect from a country like Aust which is almost entirely surrounded by other States. Next to the oce perhaps the simplest boundary is the line of latitude or longitude. W of the Lake of the Woods, the boundary between the United States a Canada is the 49th parallel of north latitude until it reaches the s In Africa the boundaries between the "spheres" of European Powers often straight lines, not necessarily coinciding with lines of latitude longitude, but drawn from point to point. The disadvantage of strai lines is that unless the country has been carefully surveyed disputes apt to arise as to position of particu places. Where a ri is taken as a bounda the line runs throu the Thalweg or cen of the river-bed; disadvantage here that unless the ri has been fully survey disputes may arise to which is its t upper course, wh there is more th one upper stream, the stream itself m change its course, l the Yellow River in China. In Europe boundaries are more complica than in other parts of the world, for they have been subject to alteratio mainly by war, for more than a thousand years. Like most bounda that have not resulted from actual annexation, they were proba originally tribal or racial, and to understand the many changes wh have taken place in them, it is necessary to master the racial moveme in Europe. Roughly they now coincide with linguistic distinctions, thou this rule is far from rigid.

FIG. 48.—*Fortresses on the French frontier.*

Over a large part of Europe the boundaries between the differe States are marked by no outstanding physical feature, and can only detected along the highways by posts or pillars or some other artific mark, or the location of a custom-house. For military purposes t boundary line becomes a "frontier" which extends for a varying space each side of the line on the map. Troops and fortresses are not rang

n the actual line, but at selected points in its neighbourhood. The oundaries between sub-divisions of old countries, like England, Germany, nd France, sometimes indicate the limits of old independent States, or of clesiastical jurisdictions, or of tribal territories; the modern tendency is abolish them, and to substitute more convenient administrative divisions. new countries, like the west of the United States and Canada, the sub-visions are more often made by mathematical lines.

Internal Development.—All material progress is dependent on e interaction between humanity and its geographical environment, and e rate of progress is almost directly in proportion to the extent of man's tivity in dealing with that environment. In Australia, and in tropical rica, the aborigines have remained at a low level of progress partly cause they have been in the main content with what nature provided th little or no active interference on their part. They are, of course, ople of a type different from those who have developed so greatly in rope, Asia, and America, and the question arises how far such types are e product of their environment. Purely pastoral pursuits in regions here only the natural resources are utilised, as in the Sahara, Arabia, and ntral Asia, do not conduce to continuous progress in a community. It only when man begins to improve the natural conditions that he enters on the upward path of development. The cultivation of the soil, the empt to domesticate animals, and improve breeds of stock, the working mineral resources, the pursuit of fishing, will among an energetic people d to the improvement of the means by which these pursuits are carried . This would develop the intelligence, and initiate manufactures of rious kinds which are bound to go on improving. Increase of popu-ion in any country will lead to the occupation of further territory and e improvement of waste lands, as well as the opening up of the country the destruction of forests. When this destruction is reckless it is apt affect the climate injuriously. The progress of internal development cessitates the establishment of communications by land and water tween different sections of the community. These will no doubt be nple enough at first, mere narrow tracks as in tropical Africa, permitting e passage of only one man at a time. The introduction of beasts of rden greatly improves intercourse and traffic, and this improvement, th increased manufactures and the establishment of market centres, ds to the growth of commercial towns.

Towns.—Probably one of the first causes which induced men to live gether in enclosures was mutual protection, either from hostile com-nities or from wild beasts. Many of the oldest towns had their begin-g under the protection of the fortified castle of a powerful chief. In ntral Africa at the present day the natives almost entirely live within closures around the chief's or headman's kraal. But as industry and mmerce, and the political life of the people develop, many other causes me into play leading to the establishment of towns and cities. The late

Mr. Green showed how natural it was that London should have started i its marvellous growth from the landing of the Romans on the first littl height of land they reached on sailing up the inviting estuary of th Thames, which is the natural highway into the heart of the land for traffi from the continent of Europe. It became the great *entrepôt* and distri buting centre where, in time, much of the commercial business of th world came to be transacted. This, with the fact that it became th capital of the kingdom and the empire, will to a large extent account fo its wonderful growth. On the other side of the island, Liverpool an Glasgow have also grown into great commercial centres, since the increas in the traffic across the Atlantic, although they both had certain natura disadvantages. Glasgow was situated on a narrow shallow stream suitabl only for boats. But it was surrounded by coal and iron mines, and i order that the products of these and of the industries which accompanie them should find a direct transit to the outside world, the shallow strean was deepened into a great highway, navigable by ocean ships. Manchest owes its growth to the fact that it is a suitable centre for the manufactur of the raw cotton imported into Liverpool from America. The handsom city of Vancouver on the coast of British Columbia, opposite the island o that name, owes its existence to its being the terminus of the Canadia Pacific Railway, and the point of departure for steamers across the Pacific The town of Rossland in the Kootenay District of British Columbia grev up from nothing to a population of 6,000 in four years, owing to its bein in the centre of a newly-discovered mining district; but such an origi contains the germ of decay, for if the mines should be abandoned the cit would be at once deserted unless other resources had in the meantim been developed. Similarly there exists a reason for the position and th development of every town in whatever part of the world it may be situate

Land and People.—The actual relations of the community or Stat and the land is an interesting feature in political geography. No doubt i primitive communities the land belongs to the whole community. I Russia at the present day the land of each *mir*, or commune or parish belongs to the whole commune. In England the "Crown" or the Stat is supreme over all land. The relations of the State to the land is a important feature in the political geography of every country.

It would be a nice point of inquiry to what extent the form of govern ment of a community is due to its geographical conditions. No doubt th peculiar geographical position of the United Kingdom which minimise the importance of the military element, has had something to do with th stable development of the political condition of the country, though the ques tion of race is also involved here. The contrast with France is very marke The modern German Empire has been welded together and extende through war, and therefore the military element is still predominant there as it is also in France for opposite reasons. The internal growth of community or State naturally leads to its expansion, to its value bein

reased, in the eyes of those who, generation after generation, have veloped it, and whose many common interests in their territory nstitute them a nation, which, as in the United States, and indeed in ost European countries, may be composed of many different races. is naturally leads to measures being taken for its defence—to the ablishment of an army, of defences for the frontiers, and of a navy ere that is required. Expansion brings a State into contact with its ghbours, with whom its relations may be friendly or hostile. If it is that the boundaries of the State are too restricted to give room for pansion, then attempts will be made to obtain additions to the territory the State by forcible seizure, by treaty, or by purchase. This expansion l also lead to commercial traffic between neighbouring States, and the ablishment of means of communication between distant States. Where State borders on the ocean or possesses navigable rivers or lakes, ships built, and the art of navigation improved. This traffic between ferent communities naturally leads to the growth of important trade ntres; thus some of the towns in southern Germany and Austria, such Innsbruck and Salzburg, grew up as a result of the traffic between Italy d central Europe, across the Brenner and other passes.

International Commerce.—International traffic has various obsta- s to contend with; there may be geographical difficulties, like mountain nges over which passes have to be found and roads made, or at a later ge they have to be pierced by railway tunnels. Or if a State borders the sea there may be a lack of convenient harbours, and this defect, less remedied, might be a serious commercial disadvantage. If the te is energetic enough it may force its way by expansion to an accessible rbour, or it may, by attention to the development of engineering, over- ne natural geographical disadvantages by such means as the creation artificial harbours, or the construction of breakwaters.

As the development of industry and commerce and of commercial ations with distant States increases, it becomes important to overcome geographical disadvantage of distance by the introduction of steam wer. Thus the means of transit become improved in speed and in rrying power, and the cost reduced, so that it becomes possible to velop regions previously untouched. Facilities for communication by ans of correspondence are developed, and electricity is pressed into the vice of humanity, telegraph lines are constructed, cables laid round the rld, or wireless telegraph established, by means of which the most distant mmunities are brought into the closest relations.

Artificial restrictions on commercial intercourse are frequently ablished, such as customs duties on certain articles imported, sometimes order to raise a revenue for the State, sometimes in order to encourage tive industries by increasing the price of imported articles. This may d to the discouragement of industry in certain countries. Thus the gar-cane industry of the West Indies has been nearly ruined because

continental nations impose a heavy duty upon it to encourage the beetroo sugar industry. Most nations have such restrictions to a greater or les extent. In the United Kingdom they are confined to one or two articles o luxury, and therefore it is said to be a free-trading country. Sometime States form what is called a commercial union, agreeing to accord eac other certain advantages in their commercial intercourse which they d not accord to other States; or it may be to agree not to give to any othe State a greater favour in the imposition of duties than they accord to eac other. Even before the union of the German States into the Germa Empire there existed what was called the Zollverein or German Custom Union, by which free trade existed between them. Until recently Han burg remained outside of this union, and was a free port, and even yo on a small area of the city, on the harbour, merchandise may be lande free of duty. Though independent of each other in many respects, th various States that form the United States have free trade with eac other, and so have the self-governing provinces of other federal dominion such as the Dominion of Canada. States may also form political unio with each other for the purpose of mutual defence under certain co tingencies.

Colonisation.—The internal development of a State, and the expa sion of its boundaries may reach a stage when further development impossible by what may be called contiguous expansion. In that case State may seek to acquire further territory at a distance from its ow boundaries. Both the Phœnician and the Greek States sent out what the called colonies. These often consisted mainly of the foundation of ne cities, sometimes with a greater or less extent of territory around. Ofte in the case of the Phœnicians they were only trading posts, more or le independent of the mother country. Carthage was originally a Phœnicia colony, and grew to be a great independent State that sent out colonies o her own. Rome's annexations became part of the empire, governed fro the centre. In modern times, Portugal and Spain, Holland, France, th United Kingdom, and Germany, have taken possession of territory at distance from their own lands. At first this was mainly done for tradi purposes, though both Portugal and Spain in the sixteenth and seventeent centuries, in Asia and America, as well as in Africa, annexed large are which were treated as part of their own dominions. Natives of the moth States went out partly as rulers, partly as traders, many of them stayi permanently, and making these lands their homes. Many of th inhabitants of the United Kingdom went in large numbers to lands beyon the seas, especially to North America and to Australia. These new ter tories were treated by the mother country as part of her own domain, a dealt with in the interests of the Home Government rather than of th population who lived upon them, and who had acquired those territori either by conquest or purchase, or by simply taking possession witho consulting the aboriginal population. This conduct led to certain of th

itish colonies in North America declaring their independence of the other country, and establishing new States. But as the other distant lonies developed and became populous and wealthy, the jurisdiction of e mother country over them became more and more slender, and so far their territory and their internal affairs are concerned, they became dependent, and even treated the mother country commercially as a reign land.

The French colonies have not developed in the same way as the itish. One of them, Algeria, is dealt with to a large extent as if it were part of France, and they are all directly governed from the mother untry, although several of them send representatives to the French rliament. This condition of things is mainly due to the fact that enchmen have not migrated and settled in their colonies to anything e the extent that has been done in the case of the British colonies. is may be partly due to the fact that the geographical conditions in ost of the French colonies are not favourable for European settlement, in that part of Canada which was once a French colony there is still arge and growing French population. The United Kingdom has posses-ns of a somewhat similar type to those of France, but these are tropical e India, the Straits Settlements, Central Africa, and the West Indies, here the native or coloured population has not been displaced by people European origin, and where Englishmen reside more or less temporarily administrators or traders. The administration of colonial possessions is metimes confided to a chartered commercial company, acting under the ntral government of the colonising country.

New Colonial Forms.—The expansion of European States has cently become so great, and commercial development so rapid, that the ost enterprising of them have sought still further to extend their terri-ries and expand their markets by taking possession more or less mpletely of such portions of the globe as remained unannexed. This ste has given rise to a new and curious political factor, seen especially the case of Africa, which within recent years has been partitioned ong the Powers of Europe. So rapid has been this partition, and so tensive has been the share of each Power, that it has been impossible take effective occupation of the territories, except at a few accessible ints. Therefore it has been agreed among the Powers concerned that rtain large areas beyond the stations occupied (the Hinterland) should regarded as the "sphere of influence" of the Power occupying the tions. The main object of thus reserving spheres of influence is mmercial, most of the Powers concerned placing restrictions on foreign mmercial enterprise. But these great areas claimed by the Powers of rope are regarded as integral parts of the dominion or empire of these wers, so that in reckoning up the area of the British, the French, or e German possessions we include every square mile of land in any part of e world over which they claim to have "influence." The one exception

is Egypt, which, although its affairs are practically directed by the Britis Government, and its principal officials are British, more so than is the ca with an Indian native State, yet it is not nominally included in the Britis Empire. Another new form of political factor has been created by on State leasing part of its territory to another. This was done in 1894, whe the British Government leased to the King of the Belgians a portion British East Africa on the Upper Nile. Previously the Sultan of Zanziba had leased part of his territory to the United Kingdom and to Germany, bu these Powers ultimately bought the territory outright. Some years ago Ge many, Russia, and the United Kingdom leased certain areas of territory i China, where they established naval and military as well as trading station More recently the United Kingdom accorded to France the lease of tw stations on the British section of the Niger. All these new departures ar due to the internal development of modern States and the necessity of find ing scope for the energy of the increasing populations beyond the boundarie of their restricted territories.

The Oceans.—As has been seen, the oceans themselves play a important part in political geography. Still further, it may be pointed ou that the sea for a distance of three miles from the coast of civilised State is regarded as forming territorial waters of these States, in contradis tinction to the "High Seas," on which there is no jurisdiction beyond tha of the flag under which each vessel sails. Certain portions of the sea more or less enclosed, are sometimes regarded as the property of th States bordering upon them, mainly for fishing purposes—thus the Berin Sea is claimed by Russia on the one side and by the United States on th other. A knowledge of the physical geography of the sea, especially o the currents and tides, is of importance to navigation. The knowledg of the ocean bed is of value in connection with the laying of telegraphi cables. It is also important to know the variations of temperature an salinity and other factors at different depths, as on these to a large exten depend, it is believed, the migration of food fishes.

The results of the interaction between advanced communities an their territories can often be shown quantitatively in the form known a Statistics, which, when arranged with intelligence, are useful as a measur of progress.

Commercial Geography.—The applications of Geography to com merce are so numerous and comprehensive that Commercial Geography must be viewed rather as a particular aspect of the whole subject than a a separate department. The necessary foundation is a sound compre hension of the principles of geography, but this is useless for the specia purpose until applied by a practical mind to practical affairs. Commercia geography may be divided roughly into three parts, dealing respectively with Commodities, Transport, and Markets.

1. The principal *Commodities* fall into two classes. (*a*) Those which exist in the substance of the lithosphere, or have been formed there by

w natural processes, so that the supply is not inexhaustible. All mineral nmodities are of this class : gold, coal, and iron are typical examples. er being obtained, most minerals require various processes of reduction purification before they are fit for use, and materials for carrying out s work must be made available before the resources acquire their full ue. (*b*) The second class consists of commodities, the supply of which n be increased and the nature modified by rapid natural processes which capable of being directed by human agency. This includes all culti- ed plants and domestic animals. Most of the raw products of the getable and animal kingdoms, such as textiles, require complicated ocesses of manufacture before they can be utilised, and the work is en carried out at great distances from the places of production.

2. *Means of Transport* include routes by land and sea, the selection of ich involves knowledge of geographical features and conditions, such mountains, valleys, rivers, winds, or ice, and of artificial difficulties like stile tribes or vested interests. They also include the vehicles or vessels ed, and their mode of propulsion and guidance, thus involving engineer- g and navigation. Pioneer gold miners in an Arctic region have to pend on their own backs or on dog-sledges for means of transport ; in ier places rivers are available for canoes or boats, deserts may have to crossed with camels, or jungle traversed with native porters. Roads d railways are later developments which render possible the most highly veloped commerce. It is evident that the value of all bulky raw terials must depend on the possibility of cheap transport. Under this ad postal and telegraph systems have also to be considered.

3. *Markets* involve a consideration of the laws of supply and demand, the artificial restrictions or encouragements presented by protective or hibitory tariffs, or by bounties, and the more natural effects of free mpetition. Distance between centres of production and consumption, ilities for handling goods in transit, nationality, language, even religion d superstition are important factors.

In the descriptions in Part II. prominence is given to the products and de on which the prosperity of each country depends, and statistics of growth of its commerce are added ; but, except in a few instances, le can be said on undeveloped resources, a subject which concerns ure rather than present conditions.

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Heraldic Colour Scheme for Flags.

1. Argent = White.
2. Or = Yellow.
3. Azure = Blue.
4. Sable = Black.
5. Gules = Red.
6. Vert = Green.

PART II

CONTINENTS AND COUNTRIES

BOOK I.—EUROPE

CHAPTER XI.—THE CONTINENT OF EUROPE

By George G. Chisholm, M.A., B.Sc.

Position and Extent.—Europe is, next to Australia, the smallest of continents. The area to be assigned to it depends upon the limits umed, which vary partly in accordance with physical and partly in cordance with political considerations. In the south-east the limit now ually adopted is that of the valley of the Manych, stretching from near Caspian Sea to the mouth of the Don, and nearly coinciding with the ministrative boundary of the Lieutenancy of the Caucasus, the whole which is thus assigned to Asia. In the east the most obvious ysical boundary is formed by the Ural Mountains and the Ural River. e area of the mainland and the adjacent islands within these limits is out 3,750,000 square miles. The addition of Iceland and Novaya Zemlya ova Zembla) brings it up to 3,820,000 square miles, and the further dition of Spitsbergen to nearly 3,850,000 square miles. In the east of ssia, however, the political boundary extends some distance beyond the als so as to include all the mineral wealth of that region, and on the ier hand, it runs, partly along the edge of a low plateau, some distance to north-west and west of the Ural River. If this political boundary is lowed it adds to the area of Europe about 100,000 square miles.

Eurasia.—On a map of the world or the eastern hemisphere, Europe es not seem to have any right to the name of continent. It is seen to a mere peninsula of a great land-mass the greater portion of which is med by Asia. To this land-mass the name of Eurasia has been given, l from some points of view the consideration of the larger unit is con- nient if not essential. For most purposes, however, the distinction of two continents is imperative. It has been established by history, and ustified by the physical conditions that have kept the history of the two ntinents in a large measure distinct. It originated where Europe and Asia separated by water, and on land the separation is continued by a vast a of desert or sparsely peopled territory between the most populous gions of both.

Coast-Line.—The coast-line of Europe, exclusive of the islands, ha been variously estimated at from 19,500 to nearly 48,000 miles. The fact i that length of coast-line is not a definite idea, and no definite figure for th coast-line ought to be taught in schools. The length varies according t the degree in which the minor indentations are taken into account. It i important, however, that the coast-line of Europe is certainly longer i proportion to area than that of any other continent; but it is much mor important that this greater length of coast-line is so largely due, not t small bays, gulfs, and creeks, but to great inland seas. The whole o Europe is thus brought into easy communication with the ocean.

Surface Features.—These viewed broadly, are very simple. In th north-west there is an extensive highland region occupying the greate part of Scandinavia and advancing to the water's edge in the countles fjords of Norway. These highlands reap pear, to a large exten in the same form, i the north-west of Sco land, and in a modifie form in the west o Great Britain generally in the angles of Irelanc and in Normandy an Brittany in France Another extensive an loftier highland regio occupies the souther countries, spreadin northwards in the are between Italy and th Baltic to about 51½° N

FIG. 49.—*Europe, showing circles of 600 and 1,200 miles radius from Cracow*

Between these great highland areas there stretches an area of lowland mainly composed of low plains broken only by seas. This area begins i England to the north of the English Channel and south-west of the Nort Sea, and on the mainland stretches continuously from the shores of th Bay of Biscay, the English Channel, and the North Sea to the Ura Mountains, spreading out in Russia from the shores of the Black Se to those of the Arctic Sea.

In the highland region of the south there are certain minor features to important to be passed over even in a general survey. These minor feature are of two classes—(*a*) mountain ranges or systems, (*b*) valleys or plain The former are the *Alps* in the heart of this southern highland region, th *Carpathians* in the east, the *Balkans* in the south-east, the *Appennines* in th peninsula of Italy, and the *Pyrenees*, stretching from the Bay of Biscay t the Mediterranean and forming a natural boundary which has never bee

g ignored in history. Of the lowland minor features the most important (1) the valley of the Danube, stretching on the whole east and west ough nearly the whole of the northern half of the mountainous region, l expanding in its lower part into two great plains, one between the s and the Carpathians drained also by the Theiss, the Drave, and the e, and the other outside the Carpathians between these mountains and the kans; (2) the valley of the Po, between the Alps and the Appennines; the north-to-south valley of the Saône and Rhone, between the Central teau of France and the highlands connecting it with the Vosges on the st, and the Alps and Jura on the east, a valley of all the more consequence torically and commercially because it is separated only by a low water-ting between the Vosges and the Jura (the opening known as the rgundy Gate) from (4) the equally important north-to-south valley of the ddle Rhine from Basel to Cologne; and (5) the valley, or rather relative pression, called the ssage of Naurouse, tween the foot-hills the Central Plateau France and those of Pyrenees, contain- the low water-rting between the ronne and the Aude.

FIG. 50.—*The Configuration of Europe, showing Highlands and Lowlands.*

The Alps. — Although the Alps are the most extensive ountain system in rope, being surssed in this respect h by the Scandivian Highlands and Ural Mountains, they are the loftiest, and they contain the sources many of the most important streams of the continent. Their surface shared, unlike the larger systems, by a number of different countries. eir limits are everywhere well marked except where they unite with Appennines. Here the proper line of division has been much disputed, t now there is a nearly general agreement in placing the boundary the Collo dell' Altare or di Cadabona, a pass about 1,600 feet in height, the north-west of Savona on the route to Mondovi. From this point ey stretch round in a curve, west, north, then east—westwards to the ntier of France, then northwards on the borders of France and Italy, d finally eastwards through Switzerland and the west of Austria. Their al extent is about 80,000 square miles, or not much less than that of the inland of Great Britain. Their total length is about 680 miles, their least dth, between Mondovi and the Gulf of Genoa, about 30 miles, and their

greatest width, about the meridian of Verona, a little less than 160 miles. (See Fig. 210 for contrast with other mountain systems.) The highest peak is Mont Blanc, 15,775 feet, in a short range on the borders of France and Italy. Monte Rosa, on the borders of Switzerland and Italy, in the Pennine Chain, rises in the Dufourspitze to 15,215 feet, and there are several other peaks above 14,000, and many above 13,000 feet in height.

The lower slopes of the Alps, up to about 5,300 feet in height, are known as the Fore Alps (in German *Voralpen*, in Italian *Prealpi*), those next in height up to about 9,000 feet, as the Middle Alps, and those above that height as the High Alps. This last altitude may be taken as the average snow-line in about the middle latitude of the Alps, 46½° N. The snow-line is, however, higher on the south side (9,200 feet) than on the north side of the Alps. The higher valleys are filled with glaciers, that of the Lower Grindelwald descending to about 3,500 feet (formerly lower).

Geographical Divisions of the Alps.—These mountains are divided with respect solely to their direction and surface features, into three great and well-marked divisions, the *Western Alps* comprising the section with a north-to-south trend between the Great St. Bernard Pass north-east of Mont Blanc, and the Collo dell' Altare, the *Central Alps*, extending thence to the Brenner Pass with the valleys of the Adige-Eisack and the Wipp leading up to that pass on both sides, and the *Eastern Alps* comprising all the remainder. In the Western Alps the subsidiary ranges and the valleys are generally tortuous, at least on the outer or French side of the system, but in the other two divisions longitudinal mountain ranges and long valleys running between them east and west are a well-marked feature.

Passes of the Western Alps.—On the east or Italian side of this division secondary chains run inwards towards the basin of the Po with some regularity, and among the valleys thus formed, two are of great importance with regard to the communication across the mountains, each of them leading up to two important passes. One of these is the valley of the Dora Riparia leading due west from Turin up to Susa, where the road forks, one branch going north-west across the Mont Cenis Pass (6,835 feet) to the valleys of the Arc and Isère, the other going south-west across the Genevra Pass (6,080 feet) to the valley of the Durance and the south of the Rhone valley. Both of these were much used in the middle ages, but the former has been superseded by a railway tunnel. The second important valley is that of the Dora Baltea, leading up to Aosta, the town still commemorating the name of its founder Augustus, who built it as the key of the two Roman roads laid from this point, one across the Great St. Bernard (Mons Jovis) to the valley of the Rhone, the other across the Little St. Bernard, south of Mont Blanc, to the valley of the Isère.

Passes of the Central Alps.—Several passes long combined to confer importance on one city in northern Italy—Milan, and one route

the north side, that of the Rhine valley above the lake of Constance. the south side of the Alps most of these routes followed at first the of the lake of Como or were gained by a boat-voyage up that lake, one of them ascended Lago Maggiore and then struck northwards. On the north side all of them after crossing a single pass, at most two passes, reached the Rhine valley above Chur (Coire, *ia Rhætorum*), and emerged from that valley almost due south of n, on the Danube, thus contributing to the importance of that town. Roman times and till late in the middle ages, the Septimer was the st important of these passes, though it is no longer a carriage-road. nore direct route across the Alps from Milan by the St. Gothard Pass s not made practicable till a late period, and not made easy till 1707, en a tunnel was pierced through the side of the gorge of the Reuss. 1882 this route was supplemented by a remarkable railway tunnel miles long (see Fig. 134). Even in Roman times Milan was connected h the Rhone valley a road following at t the west side of go Maggiore, and then oss the Simplon Pass oo feet), which is now e being superseded by ilway tunnel of even ater length (about 12¼ es).

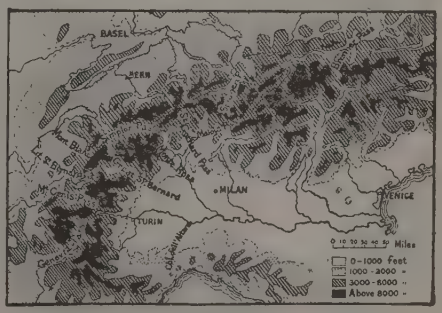

FIG. 51.—*The Alps and their chief Passes.*

The Brenner.—The nsverse breach form- the Brenner route, taken as the line of narcation between the ntral and Eastern Alps, is so well marked and for the most part convenient that it has formed from the earliest times an important hway both for commerce and for war. The pass itself is low ly 4,470 feet), and if the Inn valley is made use of downwards no er pass has to be crossed in the whole breadth of the mountain sys-. From the remains found on this route we know that it was de use of in prehistoric times by the Etruscans. It was one of the t of the Alpine passes to receive a Roman road. It was again again followed by the Holy Roman emperors in their expeditions from isbon, due north of the outlet of the Inn on the Bavarian Plateau, to ly. It was the first of the Alpine passes to have a carriage-road in the dern style laid across it (1772); and the first to get a railway carriage r it (1867). The chief tunnel on this line is rather more than half a e long, and there are twenty-six shorter tunnels.

Hydrography.—Besides being a centre of radiation for important

streams, the Alps form one of the principal lake-regions of Europe. The lakes, many of which are celebrated for the beauty of their surroundings, mostly lie on the outer margin of the system (Maggiore, Lugano, Como, Iseo, Garda on the south; Geneva, Zürich, Constance, Ammer, Würm, Chiem, König, Hallstatt, Wolfgang on the north); but others (Walenstadt, Lucerne, Brienz, Thun) lie nearer the heart of the system.

Another important centre of radiation for rivers is the higher ground to the south of St. Petersburg culminating in the Valdai Plateau. From this area issue the Volga and one or two of its chief tributaries, the Dniester, the Western Dvina and the Volkhov. To the north and west of this area, in Russia proper, Finland, and Scandinavia there is another region abounding in lakes of all sizes and shapes. Among these are the largest in Europe—Ladoga, 7,004 square miles, about one-tenth smaller than Wales, Onega, 3,765 square miles, Chudskoye or Peipus, 1,356 square miles, Vener, 2,409 square miles, Vetter, 758 square miles, this last accordingly, though the smallest of the five, being equal in size to the county of Surrey.

A third region abounding in lakes is the northern part of the German plain, especially north and east of the Elbe, and a peculiar feature of the eastern section of this region is the large number of lakes in it (mostly very small) without any visible outlet.

Geology.—The geological structure of the mountainous region of southern Europe is as complicated as its orography. The same is true of the highland region of the British Isles, but in Scandinavia the geological changes belong to such a remote past that the steps in the change are no longer distinguishable. The solid rocks both of this peninsula and the adjoining parts of Russia to the east of the White Sea and the shores of Lakes Ladoga and Onega are mainly composed of materials so metamorphosed that they are all classed as Archæan crystalline rocks. Between the highland areas the rocks are for the most part more recent except in northern Russia. In the English lowlands Jurassic rocks cover a considerable area, but on the mainland of Europe those of Cretaceous age are generally the oldest, except in the region just mentioned. Above the Cretaceous areas of the plains are extensive deposits of Tertiary age (also widespread in southern Europe); and northern Germany, Denmark, and Holland are mainly composed of Quaternary deposits.

In the Quaternary history of Europe an important episode was the advance on more than one occasion of a vast ice-sheet from the Scandinavian highlands over a great part of the plains, and of smaller ice-sheets from the chief mountain ranges of the south, with glaciers of much larger dimensions than those now seen protruding from the margin of the sheet down the valleys. This period is known as the Ice Age, or sometimes the main periods of advance of the ice are distinguished with more precision as the First, Second, and Third Ice Ages. The result of this advance of ice has been to cover vast regions with deposits of morainic matter, in the

n of clay, shingle, or larger fragmentary material, or with deposits of her kind due to the action of water under the ice. The great lake icts of Europe all belong to the regions once buried under these vast coverings.

Twofold Division of the Alps based on Geological Structure. this division now generally recognised, the line of demarcation ween the Eastern and Western Alps is that of the route across the , from Milan to the upper end of the lake of Constance, by the Lago giore (east side), the Val Mesocco, and the Hinter-Rhein. Throughout Alps the central zone, which contains the highest peaks, is composed ly of hard crystalline rocks, outside of which sedimentary rocks occur. of the line mentioned these sedimentary rocks occur both on the outer hern) and inner side, and on both sides are largely composed of lime- es and dolomites, though on the north side these are largely inter- gled with sandstones and slates. West of the line there is no inner , and in the outer zone stones and dolomites ly predominate. The ture is shown in the sec- of Switzerland (Fig. 130).

limate.—This is one of heads under which it is rtant to remember that pe is after all only a peninsula of Eurasia. climate of Europe can mpared only with that he corresponding lati- of the western portion orth America, not the e width of that conti-

FIG. 52.—*The Glaciated Area of Europe.*

This comparison reveals analogies, but also differences greatly to dvantage of Europe. In both cases, the chief rain-bearing, in winter hief heat-bearing, and in summer the chief cooling winds are from outh-west. Europe, however, in addition to the advantage of receiving inds from warmer seas, owing to the indirect influence of the Gulf m, has no mountains near the coast running at right angles to these s, and thus cutting off their influence within a short distance; and, e other hand, its great inland seas, the Baltic in the north, and the terranean in the south, favour the penetration of the equalising nce of the sea further into the interior. Moreover, southern Europe he benefit of a mountain barrier on the north to ward off cold erly or north-easterly winds. The result is that all kinds of cultivated cts, whether those of the temperate zone, such as wheat and barley, se of a warmer clime, such as the vine, orange, and olive, can be ated in a higher latitude in Europe than anywhere else on the globe.

Barley is regularly grown in Europe (Norway) several degrees within the Arctic Circle. For certain products the advantage of more prolonged sunshine thus enjoyed is of great consequence in improving the quality.

But owing to the direction of the prevailing winds in Europe, there is the same increase in range of temperature from west to east as in western North America, and the same tendency to a diminution of rainfall in the same direction where not counteracted by special circumstances. The easterly increase of range of temperature is noticeable even in the Mediterranean region in spite of the equalising influence of the great inland sea. In the higher latitudes of Europe, however, the increase of range is due more to the increase of winter cold eastwards, in the lower latitudes rather to the increase of summer heat in that direction.

Rainfall.—The easterly decrease of rainfall is regular in Europe only in the region of the plains. Everywhere of course mountains promote a higher rainfall locally, but the effect of position with regard to the prevailing rain-bearing winds is seen in mountainous districts also in the fact that the heaviest rains generally occur in Europe to the west and south of the mountains, and on their western and southern slopes. For the most part the rainfall is tolerably equally distributed throughout the year, but there is a well-marked contrast between the eastern plains and the Mediterranean region, especially its southern portion, as regards the season of most abundant rains. In the eastern plains the most abundant rains are those of the summer. The winter rains are perhaps as frequent as those of summer, but are extremely scanty. Though the winds then blow across the isotherms, and hence at that season are constantly advancing into regions in which the temperature becomes more favourable to condensation, yet from that very fact, they are so rapidly drained as they proceed onwards that they arrive in Russia nearly dry. The summer rains are largely due to local evaporation.

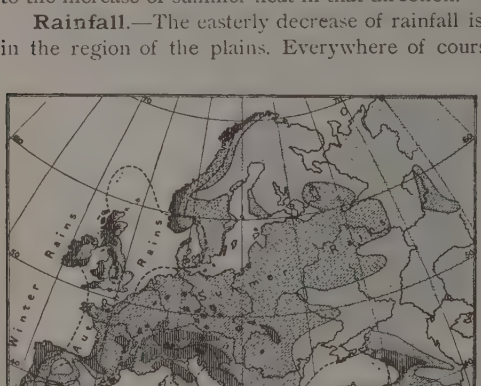

FIG. 53.—*The Distribution of Rainfall in Europe.*

The Mediterranean region, on the other hand, belongs in part to those latitudes which, during the height of summer, are included in the trade-wind zone of the North Atlantic. There is thus a tendency for the winds to be drawn to the ocean from the adjoining parts of the land, a tendency

the establishment of north-easterly winds. This is further promoted by intense rarefaction that then goes on over the Sahara. Hence it opens that the further south we go in the Mediterranean region the er the summers become, and in the extreme south they are almost nless. It is believed by some that the rainfall of this region has be-ne less within historical times. The evidence of this is not convincing, it is quite certain that owing to the clearing of forests with the progress population and cultivation great changes have been brought about. e forests on hill-slopes and mountain sides protected the soil from being shed away, and the presence of the soil kept the rain from running off rapidly. There was thus a greater extent of ground well supplied with isture. Rivers were more equal in volume, more useful, less destructive. w they are an alternation of rushing torrents and dry beds. Through ir torrential action they have in some places laid waste the ground with ps of rocky *débris*, in other places, sometimes assisted by the violence war, they have converted plains once proverbial for their fertility into larious swamps, presenting scenes of almost hopeless desolation.

Flora.—The greater part of Europe is occupied by a flora of uniform racter, to which the name of the Germanic flora has been given, a flora forest trees and flowering plants such as are familiar in the British nds. Only a small area in the north-east, the Russian tundras, has a e Arctic flora composed of mosses and lichens. In the Mediterranean ion, and especially in the southern part of it, there is a marked adap-on in the general habit and aspect of the vegetation to a climate with summers, and within historical times there has been an increasing fusion of vegetation of this character answering to the increasing extent arid soil just explained. In ancient times forests like those of central rope spread over large areas of the Mediterranean, but now the vailing forms are low trees with leathery often glossy leaves, retentive noisture, such as the holly and holm-oak, the laurel and myrtle, the achio nut and carob or locust tree, the orange and the olive. Thick hy plants, such as the cactus and the agave or American aloe, have also come thoroughly characteristic in the south. The trees do not form at forests, but are scattered in clumps over the landscape. Hence the ian name of such clumps, *macchie*.[1] The tendency in the Mediterranean for forests increasingly to give place to *macchie*, and these to a still ntier vegetation. In south-eastern Europe, and in the interior of ngary, vegetation has another aspect, that of steppes—vast treeless ins, thinly covered with coarse grasses and scattered shrubs.

Fauna.—In the fauna of Europe, as distinguished from that of thern Asia, there is very little distinctive. Europe is regarded from a logical point of view as forming two sub-regions of the Palæarctic ion, one composed of the Mediterranean countries, the other comprising the rest. Under this head again we are reminded that Europe is only

[1] Plural of *macchia*, from Latin, *macula*, a spot. Changed by the French (in Corsica) *maquis*.

a peninsula of Asia, for the Palæarctic region includes also all that continent north of the Himalayas. Among the larger or more remarkable mammals still found wild in Europe are the wolf, in large packs in Poland, Russia, and Hungary, and in small troops in the Jura, the Ardennes, the Pyrenees, and the north of Spain; the brown bear in Norway, Sweden, and Russia, and a smaller variety in the Pyrenees; the lynx, still common enough in Norway and Sweden, and a peculiar species all over Spain, very rare in central Europe; the beaver in eastern Europe, the European bison in the forests of Lithuania, the elk in the districts bordering the Baltic on the east and north, the reindeer in Lapland, the chamois in the Pyrenees, Alps, Carpathians, Balkans, and Abruzzi, the Grecian ibex or bezoar goat in Crete, the musimon or European mouflon in Corsica and Sardinia, the alpine marmot at high altitudes between the forests and the glaciers in the Alps, Pyrenees, and Carpathians, the bobak or Russian marmot in the Russian steppes.

People and Language.—The languages of Europe afford some indication of the differences of race in the continent, but are not to be taken as showing the proportions belonging to different races. Here, as elsewhere, historical events have brought about a great mingling of races, and various causes have led to a change of language in many regions. But if language be taken as the guide, it is important to note that probably 95 per cent. of the present population speak languages belonging to the great Aryan group, and fully 90 per cent. to three great stocks of that group, the *Greco-Italic*, the *Teutonic*, and the *Slavonic*. The first of these stocks is that in which there is least correspondence between race and language, one language of this stock, the Latin, having been spread first over the whole of Italy, and also over modern France and part of Belgium, over Spain and Portugal, and parts of Switzerland and Austria, by the prolonged dominion of the Roman power. Another language of the same origin was introduced by immigration into Rumania and Transylvania. At the present day the total number speaking languages of this stock is less than that speaking Teutonic and Slavonic languages. These are now spoken by nearly equal numbers, but in recent years the peoples of Slavonic tongue (in eastern and south-eastern Europe), have been increasing more rapidly within the continent than those of Teutonic speech (German, Scandinavian, Dutch, Flemish, and English). A larger part of the expansion of the peoples of Teutonic than of those of Slavonic speech is taking place outside of Europe. The other Aryan languages spoken in Europe are those of Keltic, Lettic, and Lithuanian stock. Keltic languages are spoken by about three millions of people in Wales, the highlands of Scotland, Ireland, and the west of Brittany, Lettic and Lithuanian by a few millions more in the west of Russia proper, and the north-east of Poland.

The chief non-Aryan languages of Europe are those of the *Finno-Tatar* group, spoken by Lapps and Finns in northern Scandinavia and Finland, by other tribes in northern Russia, by the Magyars in Hungary, and by

Turks in Turkey. A language the affinities of which are quite un-wn is spoken by 560,000 *Basques* in Spain and France at the west of the Pyrenees. Jews are scattered throughout the continent, but are t numerous in Poland and western Russia, and the adjoining parts of tria-Hungary and the German Empire. They generally speak a corrupt brew in addition to the language of the country in which they dwell.

History.—The civilisation of Europe began in the south-east and ead from the Mediterranean over the rest of the continent. On the nds and coasts of the Ægean Sea influences proceeding from Asia and ca (Phœnicia and Egypt), helped on the development of the marvellous lisation of the Greeks. The Greeks extended their influence by com-ce and by the planting of colonies from the Ægean to the shores of Black Sea on the one hand, and to those of Sicily and southern Italy he other hand. The Sicilian and Italian colonies rose to a level hardly passed by the most flourishing States of the mother country. From e economic necessities their influence on the native civilisations of y must have been immense—greater than can be detected by historical rchæological research. Ultimately, however, native civilisations pre-inated in Italy, and the most important of these arose in or near the n of the Tiber. The first was that of the industrial and commercial iscans whose chief seats were in southern Etruria, only partly ordingly in the modern Tuscany.

The Influence of Rome.—The Etruscans were vanquished by growing power of Rome, the city of the Tiber, which ultimately came pread her dominion round all the shores of the Mediterranean and hwards to the Rhine and the Danube, in places even beyond the ube. The ancient history of Europe is largely made up of the record ne conquests of this Power; but there were important periods of repose, ecially one period of rather more than 80 years (98–180 A.D.), when Roman empire at the height of its power was governed by four cessive emperors (Trajan, Hadrian, Antoninus Pius, and Marcus elius) of great ability and high character. During that time all the ntries round the Mediterranean enjoyed the blessings of peace and r to an unexampled degree. Roman institutions were established on a firm basis as to leave permanent effects on European history, and empire was provided with most of that great system of military roads united its remotest frontiers. These roads were made for defence, when a defending power is worsted roads facilitate attack, and it was these roads that barbarian hordes made repeated raids into the ire, and in the fifth century again and again advanced to its very t and ultimately overthrew it in its original seat.

The Influence of the Christian Church.—While the empire was ying, the Christian Church was growing within it, and as it grew it oted its organisation almost inevitably to that of the empire. It thus me a great unifying force, and, as some of the barbarians were

already christianised when they made their incursions and the others were speedily gained over to the Church, it served in various ways to extend and perpetuate the influences of Roman civilisation. Thus the Roman roads were not all that remained from the empire as civilising agents. But while the Church was a unifying influence, two causes were at work for centuries tending to promote disruption within the empire. One was its excessive extent from east to west, the other was the difference of language. While the Latin language prevailed over those of the conquered nations of the west, it never prevailed over Greek in the east. The regular division of the empire for administrative purposes into two sections, an eastern and a western, began at the close of the third century, A.D. This tendency to disunion was confirmed by the foundation of Constantinople as the capital of the east in 330 A.D., and by the adoption of Greek as the official language of the eastern government as it was also that of the Eastern Church. Finally, in the ninth century, about four hundred years after the overthrow of the Roman empire in the west, a dispute between the Eastern and Western Churches led to a severance which the difference of language helped to make permanent. Thus while the eastern or Byzantine empire handed on Roman influences, it did so with certain differences. While all western, including all Teutonic, Europe may be said to show direct or indirect traces of the influence of the Roman empire of the west, Russia and some other parts of Slavonic Europe have received such influences both in Church and State with an eastern stamp. The western Slavs of the basins of the Vistula, Oder, and upper Elbe (Poland and Bohemia), as well as that of the Morava (Moravia), were christianised by German missionaries, and so also were the Magyars of Hungary, hence all these adhered to the Roman Church.

The Saracens and the Crusades. — Even before the final separation between the Eastern and Western Churches another faith, Mohammedanism, had made conquests in Europe. In 711 the Saracens, as the Mohammedans of that time were called in Europe, crossed the Strait of Gibraltar and rapidly overran nearly the whole of the Iberian peninsula, establishing a dominion which, though gradually contracted, was not finally overthrown till the end of the fifteenth century. Less durable conquests were made in Sicily, Crete, and elsewhere. The resistance to the Saracens was at first local, but at the end of the eleventh century a great European movement was set on foot for the recovery of the Holy Sepulchre at Jerusalem from their hands. This led to the first Crusade (1096–99). Six others followed down to 1270, and had important effects on European commerce, industry, and civilisation, though they failed in their main purpose.

Subsequent Events. —Subsequently to the Crusades the chief events of European magnitude were the invasion of the European territories of the Eastern Roman Empire in the fourteenth, and the final capture of Constantinople by the Turks in the fifteenth century (1453), the scattering

Greek scholars over western Europe and the revival of Greek learning then followed, aided by the invention of printing with movable types had taken place in the first half of the same century, the discovery America in 1492, and of the sea-way to India in 1497–98, and the sm of the Western Church due to the movement for reform which brought to a head in 1517 by Luther's affixing his famous theses to door of the castle-church at Wittenberg.

The Origin of the Present States.—In the limits of European ntries at the present day we see partly the influence of geographical ditions, partly that of historical causes, among which the events briefly ched in the preceding paragraphs are important. The kingdoms of n and Portugal originated in the wars for the recovery of the Iberian insula from the Saracens or Moors. Several different Christian States e formed in the course of this conflict, but most of these were finally ed through the marriage of Ferdinand of Aragon and Isabella of ile, their grandson Charles (Charles V. of Germany) inheriting in 1516 whole of their dominions, including the kingdom of Granada, which had conquered from the Moors (1492). Portugal, however, remained, still does, a separate kingdom, with a territory separately recovered n the Moors, with the aid of a Burgundian count who became the der of the first royal dynasty.

The abandonment of the British Isles by the Romans early in the fifth ury, led to the invasion of Great Britain in the latter half of the same ury by Teutonic tribes, Angles and Saxons, who were the real founders he kingdoms of England and Scotland, though the latter took its name n a Keltic dynasty.

The separate dominions of France and Germany may be dated from year 870, when the great empire of Charlemagne (Charles the Great), rded, in virtue of a consecration by the popes, as a restoration of the nan empire of the West, was finally divided between two of his endants, the division corresponding approximately with that of the nanic and Teutonic tongues. Nearly a century later the imperial ity was again revived by the popes, being conferred in 962 on Otho Great, the first of the so-called Holy Roman Emperors, whose dignity ived in name till 1806. The dominion of Otho and some of his essors embraced not only the bulk of Germany but also all the Alpine s and a great part of Italy, but the obstacles placed by geographical ditions in the way of a real union, must be recognised as among the es that led to the breaking up of both Germany and Italy into a large ber of minor States, so that there was no united Germany or united y till the nineteenth century.

The domain of the modern German Empire, founded in 1871, differs n that of the Holy Roman Empire chiefly by the exclusion of the man parts of Austria-Hungary, of Switzerland and the Low Countries, the inclusion of extensive territories in the east once, or still, Slavonic

in speech. The present dual empire of Austria-Hungary is composed of the territories gradually acquired by the house of Habsburg. With that house the imperial title derived from the Holy Roman Empire (latterly purely nominal) was uninterruptedly associated from 1438 till 1806, when it was relinquished for that of Emperor of Austria.

The Low Countries now form the kingdoms of Belgium and the Netherlands, after a very chequered history. In the sixteenth century entirely attached to the crown of Spain, the northern provinces broke away (1579) in the period of the Reformation, while the southern provinces remained attached now to one crown, now to another. In the Peace of Westphalia (1648), which concluded the Thirty Years' War, the independence of the northern provinces was recognised. The provinces were all again united by the Congress of Vienna in 1815, at the close of the Napoleonic period, but were separated once more in 1830, when the southern provinces revolted and formed the kingdom of Belgium. The Peace of Westphalia recognised also the independence of the provinces that formed the nucleus of the present Switzerland.

The Slavonic territory of the modern German Empire was mainly taken from the former kingdom of Poland. This State became a kingdom in 1320, was for a time extensive and powerful, but misgovernment, due to an impracticable constitution, led to its partition among the three adjoining powers, Prussia, Austria, and Russia, on three occasions (1772, 1793, and 1795), the last partition being complete. Before the last partition the troubles of the French Revolution followed by those of the Napoleonic period (1789–1815) had broken out. The Congress of Vienna, which subsequently settled the affairs of Europe, recognised the results of this final partition, as it did most of the other territorial arrangements existing at the beginning of the period. The only important new arrangement that still subsists from that time is the personal union of Sweden and Norway under one king, the latter kingdom having previously been associated with Denmark.

Since that time the principal changes in the map of Europe have been the transfer of Alsace-Lorraine from France to Germany (1871), and the reorganisation of the Balkan Peninsula at the expense of Turkey: Greece made an independent kingdom in 1830 and extended in 1881; the principality of Rumania created by the union of Moldavia and Wallachia in 1859. By the Treaty of Berlin in 1878, Rumania, Servia, and Montenegro were declared independent of Turkey, Bosnia and Herzegovina placed under Austrian administration, Bulgaria made a principality tributary to Turkey and Eastern Rumelia an autonomous Turkish province under a Christian governor, an arrangement that lasted only till 1885, when Eastern Rumelia joined Bulgaria. In 1881 Rumania, and in 1882 Servia, was raised to the rank of a kingdom.

The Great Powers of Europe—the United Kingdom, Russia, Germany, France, Austria-Hungary, and Italy—although not free from mutual

sies, exercise in some respects a common influence on the peace of orld. The gradual consolidation of Europe into a comparatively number of powerful ries has been ac- anied by the re- of obstacles to commnuication. The ng railway system u d e s many inter- nal express routes, radiate from Paris, n, and Vienna as es (Fig. 54). Of the Indian mail through Paris and to Brindisi; the nt Express from through Vienna, pest and Belgrade onstantinople; and the Northern Express route from Paris through n to St. Petersburg, are the longest on which trains run without ge of carriage.

FIG. 54.—*The Main Railways of Europe.*

STATISTICS.

THE COUNTRIES OF EUROPE IN ORDER OF SIZE.

	Area sq. miles.	Pop.		Area sq. miles.	Pop.
Russia ..	2,095,500	129,000,000	Greece ..	25,300	2,400,000
Austria-Hungary	261,000	45,400,000	Servia ..	18,700	2,500,000
German Empire	210,000	56,400,000	Switzerland ..	16,000	3,300,000
France ..	207,200	38,600,000	Denmark ..	15,300	2,400,000
Spain ..	195,000	18,300,000	Netherlands ..	12,700	5,180,000
Sweden ..	171,000	5,100,000	Belgium ..	11,373	6,700,000
Norway ..	125,600	2,200,000	Montenegro ..	3,500	228,000
United Kingdom	121,700	41,600,000	Luxemberg ..	1,000	236,000
Italy ..	111,000	32,400,000	Andorra ..	175	6,000
Turkey ..	65,000	6,100,000	Liechtenstein	61	10,000
Rumania ..	50,600	6,000,000	San Marino ..	23	8,000
Bulgaria ..	37,300	3,700,000	Monaco ..	8	13,000
Portugal ..	34,500	5,400,000			

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CHAPTER XII.—THE UNITED KINGDOM OF GREAT BRITAIN AND IRELAND

I.—GENERAL

By Hugh Robert Mill, D.Sc.

Name.—In popular usage the United Kingdom of Great Britain an Ireland is most frequently, though incorrectly, called *England*. Whe James VI., King of the Scots, acceded to the English crown he employe the name *Great Britain* to include the kingdoms of England and Scotlan and the use of this name for the whole country has since been general i official writings, while the more concise form of *Britain* is also in use. It is, however, better in several ways to call the country as a whole the *Unite Kingdom*, in the same way as the United States of America are spoken o as the United States. It is convenient to use the word *British* for "of th United Kingdom" as it is convenient to use *American* for "of the Unite States." The official form *Britannic* does not commend itself for genera adoption. Euphony suggests the use of *Anglo-* in compound words wher the name of the United Kingdom comes first, and of *British* where comes last; thus, *Anglo-American* but *Russo-British*. It is necessary t give these definitions because there is no general usage in the country, an some local jealousy exists as to the abuse of the words. The *British Islands* is a convenient name for the region occupied by the Unite Kingdom, and the *British Empire* is a popular expression including all th countries and colonies acknowledging the British Crown.

Position and Extent.—The United Kingdom occupies two larg islands, Great Britain and Ireland, and about 5,000 small islands an rocks lying in groups to the north—Orkney and Shetland; to the west— the Hebrides, Isle of Man, the small coast islands of Ireland, and th Scilly group; and to the south—the Isle of Wight, and the Channe Islands, the latter belonging physically to France. The total area is 121,00 square miles, the United Kingdom coming eighth in order of size among the countries of Europe. It is convenient to remember that the whole lan and sea area of the British Islands is defined by a rectangle of 10° o latitude and longitude. Only Lizard Head, the Scilly, and the Channe Islands lie south of the parallel of 50° N.; and only a part of the Shetlan group extends further north than 60° N. The meridian of 10° W. run through the tips of the western peninsulas of Ireland; while only th south-east of England projects beyond the meridian of Greenwich.

Geology and Configuration.—Although there are now no loft mountain chains or great rivers in the British Islands, there is much variet of land-form and of scenery, the result of remote geological changes, and o the more recent action of erosion upon the different kinds of rocks whic

the surface. In no other part of Europe, or perhaps of the world, great a range of geological strata found in so small an area. In the and west the most ancient and disturbed rocks known form the land, is similar in character to the Scandinavian peninsula. Towards the and east these ancient rocks are succeeded by Carboniferous strata ining the Coal Measures, which give place further south and east to recent formations y but little dis- d and resem- those of western ce. The northern western regions possibly been on whole land areas a very early gical period; the of the south and ave been formed e sediments worn e northern lands spread out on hores of seas, or reat fresh lakes. canic outbursts ng to the ac- lation of masses rd igneous rocks occurred at vari- geological periods to and includ- the Tertiary in egions of ancient , which have also subject to much ng and folding; pparently the more t regions of the and south were not affected in this way. These facts fully account for the rrence of the highest land and finest scenery in the north and west, the lowest and most uniform towards the south and east (Fig. 55). y of the minor surface features of the islands have been produced by ce-sheet and glaciers of the Great Ice Age, which scratched, polished, rounded the exposed rocks, and smothered the lower grounds in vast ts of boulder clay, partly obliterating the former surface relief. The me south of England alone escaped this action. The indented island-

FIG. 55.—*Configuration of the British Islands.*

starred coast of the west of the British Islands points to a depression or a tilting of the whole region westwards after a complex system of valleys had been impressed upon it by erosion. The drowned valleys of the west form fjords or rias penetrating the land, or uniting together to cut off islands. On the east the generally smooth coast, practically without islands, may result from the softer nature of the rocks.

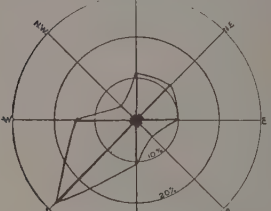


FIG. 56.—*Frequency of Winds from different directions.*

Configuration and History.—The natural physical divisions of the British Islands have given rise to the larger historical divisions by guiding the long struggles of the settled inhabitants against successive invaders. Wherever the character of the land allowed the defenders to offer effective resistance to invasion the old race was enabled to retain its independence, language, and customs. Strong local differences, even distinct feelings of nationality and separate laws are still perpetuated, long after the complete political union of the old countries into the United

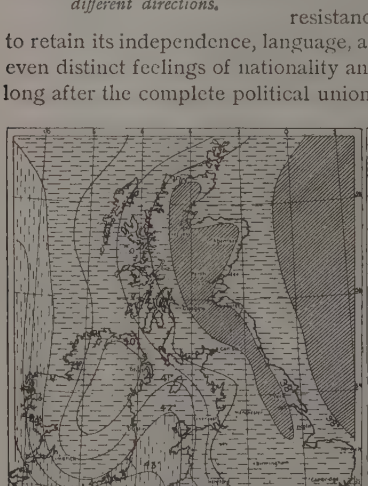


FIG. 57.—*Temperature of the British Islands in January.*

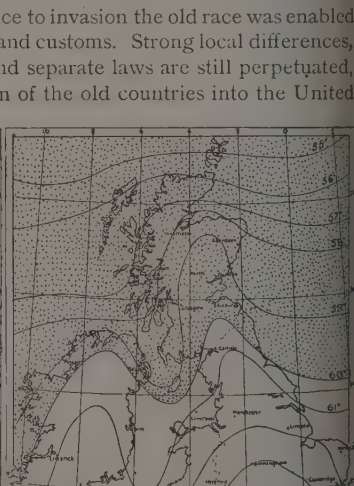


FIG. 58.—*Temperature of the British Islands in July.*

Kingdom, of which England, Wales, Scotland, Ireland, the Isle of Man and the Channel Islands may be looked upon as natural units.

Climate of the British Islands.—The position of the British Islands in latitude secures to them the same amount of heat from the Sun and the

duration of day and night, summer and winter, as are experienced entral Russia, southern Siberia, Kamchatka, British Columbia, and ador; but the direction of the prevailing winds renders available ughout the year much of the heat which the Sun has radiated on more hern regions. As the British Islands are usually covered by the edge e North Atlantic area of low pressure the prevailing wind is south-erly. Wind blows from the south-west a greater number of days in each month from all other directions together (Fig. a fact which makes the west end of a the least smoky and therefore the best ter for residence. The south-westerly ls are commonest and strongest in winter. April and November they are weakest, in these months cold easterly winds are paratively common. The warm water vn as the Gulf Stream Drift is driven ist the British Islands on the west, taining the generally high temperature e air. The average temperature of the British Islands for the year is t 48° F. decreasing from 53° in the Scilly Islands to 45° in Shetland, at on the average the climate grows 1° colder for each 100 miles towards the north. The warmest month is usually July (Fig. 58), when an average temperature of 64° prevails round London, and of 54° in Shetland, the air on the whole becoming cooler towards the north, a natural consequence of the Sun being the chief source of the heat supply. But in winter there is an entirely different set of conditions. In January (Fig. 57), the coldest month, the temperature shows no relation to latitude, but the air grows warmer from east to west, indicating that the chief source of heat is then the warm wind blowing from the Atlantic. The east of the British Islands has the average temperature of 39° from Shetland to London, the coldest region, just inland from the east coast, having an average of 38°. In the west and south-west of Ireland the temperature averages from 43° to 45° in January. The winters are thus everywhere mild, but mildest he coast and especially in the west; and the summers are everywhere but coolest on the coast and in the west. Snow falls on the higher nd every winter; but even the highest mountain, Ben Nevis, is ys free from snow in summer.

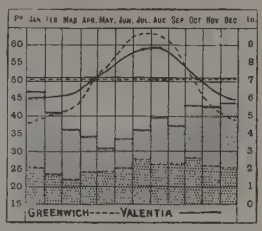
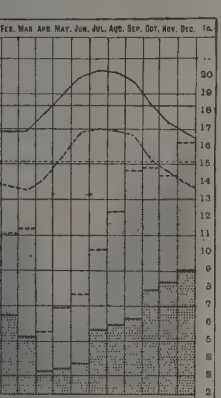


FIG. 59.—*Average monthly temperature and rainfall for Greenwich and Valentia.*



60.—*Average monthly temperature and rainfall for Ben Nevis nd Fort William.*

Rainfall and Storms.—The rainfall depends conjointly on the prevailing wind and the height of the land. The west coast is naturally the wettest. In Ireland and the outer Hebrides the average annual rainfall is 40 inches, and is very uniformly distributed, as the rain-bearing wind is not stopped by any continuous high land. In Ireland also the numerous lakes and great expanses of damp bogs maintain the moisture of the air. In Great Britain the barrier on the western edge of the Scottish Highlands precipitates a rainfall of over 80 inches, and the rainfall on the heights of the Southern Uplands, the Lake District, Wales and the peninsula of Cornwall and Devon also exceeds 60 inches ; but the whole of the east of the island receives less than 40 inches, while along the east coast less than 30 inches fall ; and in a broad district from the Humber to the Thames the annual rainfall is less than 25 inches. The heavy fall of the west runs off the steep slopes of the land very quickly, while the more moderate supply of the east flows off slowly, and the clay of which much of the plains is composed allows the small rainfall to remain a long time in the soil, thus tending to equalise the conditions in the west and east so far as agriculture is concerned. The weather as a whole is changeable ; fogs are common in all large towns in winter, and the absence of any meteorological stations west of the British Islands often makes it impossible to predict the paths of the frequent and sometimes dangerous cyclonic storms which sweep in from the Atlantic.

Flora.—In the highland regions of great rainfall little soil remains on the steep mountain slopes, and the land presents a bare surface of stone or rock. On the gentler slopes covered with thin soil only moss, fern and heather can grow, and this forms the characteristic vegetation of the high moorlands of Scotland, Wales, and the Irish mountains, which glow with a wealth of purple blossom in autumn. Most of the rest of the surface is covered naturally with rich grass suitable for pasturage. The yellow blossoms of the whin or gorse appear in every month of the year, and in spring the wild flowers of the low grounds are rich and varied.

At the dawn of history Great Britain was a densely wooded island but now less than 4 per cent. of the land is under trees, and little of the original forest remains. The clayey plains and peaty moorlands were largely occupied by morasses, most of which have been drained and reclaimed, the most characteristic which remain being the great bogs of Ireland. The native flora of the British Islands is identical with that of continental Europe with the addition of a few American species. The fact that there are fewer species common to the continent and Ireland than to the continent and Great Britain is one of the strongest proofs of the earlier separation of Ireland from Great Britain, than of Great Britain from continental Europe. Pyrenean types found in the south-west of Ireland but not in Great Britain, may point to a former land connection with south-western Europe. The chief indigenous trees are the oak and beech in the lower grounds, and the Scots pine and birch in the higher and more

ern districts. Many trees and all cultivated plants have been intro-
l; and those plants common on the continent but rarely seen in
Britain, such as the sugar-beet, vine, and tobacco could be success-
reared in many parts of the country if proper care were bestowed on
The mildness and moistness of the climate gives to the vegetation
e British Islands a characteristic freshness at all seasons.

auna.—The native animals of Britain in the time of the Romans
ded the brown bear, wolf, wild boar, and beaver, all long since
minated, and the wild ox, of which a few herds have been preserved.
ed deer is still found in the highlands of Scotland, Exmoor, and the
-west of Ireland, the fallow deer is common in parks, the fox, badger,
wild-cat, rabbit and squirrel are found nearly everywhere. The roe-
polecat, common brown hare, many varieties of the weasel family, the
and the whole family of voles or field mice are absent from Ireland,
igh abundant in Great Britain. The Irish hare resembles that of the
ands, which turns white in winter. There are only about twenty
es of mammals native to Ireland, compared with forty known in
Britain and ninety in Germany. This fact is another proof of the
r separation of Ireland than of Great Britain from the continent.
e are numerous species of indigenous birds, but the great bustard
he capercailzie have died out. The stork, so common on the eastern
of the North Sea, is practically unknown; and the nightingale,
igh abundant in southern England is rarely heard in Scotland and
in Ireland. Migratory birds visit the islands from the Arctic regions
nter, and from southern countries in summer. The viper is the one
nous snake, and is not common, while no snakes of any kind are
l in Ireland, where the only reptile known is a lizard. All the animals
onomic value, and a large number of those protected for sport, have
introduced from other countries. The fish round the coast are those
non to all north-western Europe. Flat-fish, as well as cod, haddock
whiting swarm in the shallow North Sea and on banks in the Atlantic;
hoals of herring and pilchard appear off the coasts at certain seasons.
oysters, famous in the days of the Romans, retain, if they have not
ased, their reputation. The salmon of the northern and western
s are also renowned.

istory of the British Peoples.—Widely scattered remains of very
date show that the first inhabitants entered the British Islands while
were still part of the continent of Europe. When Pytheas, the Greek
ist from Massilia, discovered and sailed along the east coast of Britain
B.C. 330, he reported that the inhabitants practised agriculture, brewed
and mined tin. At a later date successive invasions of Keltic tribes
place across the English Channel, and when Julius Cæsar landed in
5 he found the coast occupied by the Belgæ; and in the interior there
less civilised Kelts already being pressed towards the western moun-
and islands. To this day Keltic names are preserved for rivers—*e.g.*,

Afon (Avon), *Don* and *Uisge* (Ouse, Usk, Esk, Exe)—and for hills, in ever part of the British Islands. The Keltic word *Dun*, a fortified height, gav rise to the names of both London and Dunedin (the early form of Edi burgh). The Romans, without mixing much with the people, governe Britain for four centuries, erecting great walls across the northern parts England and the central plain in Scotland to protect the settled peopl of the south from the Picts and other wild tribes of the north, and layin out a complete system of roads, many of which still run across the countr as straight as ruled lines, in contrast to the poo and winding tracks which came into use later. O the fall of the Roman Empire Teutonic tribe from the continent descended on Britain and pa ticularly on England, some as invaders, others a defenders of the British tribes, but all settled i the land, dividing it into separate kingdoms. Th Angles brought their name of English, which ult mately became the general designation of th language, although they did not predominate i number or strength over the other tribes. Th Saxons settled great tracts in the southern half of England, the name of the old kingdoms of the East Saxons, Middle Saxons, West Saxon and South Saxons surviving in Essex, Middlesex, Wessex and Susse The organisation of the township or early English unit of governmen is due to these German tribes. Simultaneously with them the pira ships of the Scandinavian vikings descended on the coasts, both east an west, to plunder or to rule. The Northmen settled mainly on the shor of Scotland and the north-east of England, where most of the place-name even now have Scandinavian endings, such as *by*, *ay*, and *ster*. The Danes for a time ruled the larger part of England, but the greatest Scandinavian influence on the country was brought to bear in 1066, when the descendants of the vikings, who had settled in the north of France and named it Normandy, conquered the Saxon or English lands. They unified the southern part of the country, annexing Wales and Ireland, gave the English language a notable impulse towards its present form, and ingrafted a French culture on the Germanic people. Generally speaking, while mixture between the Keltic and Teutonic races was always taking plac the Keltic clans kept their independence under their chiefs in the highland and islands of the west, while the Teutonic tribes became fused into homogeneous nation on the lower and more fertile lands of the east. Gre Britain, from the time of the Norman conquest until 1603, was divide between the small northern kingdom of Scotland and the large kingdo of England. The two were always at enmity, and a broad strip of debat

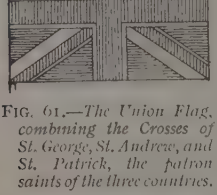


FIG. 61.—*The Union Flag, combining the Crosses of St. George, St. Andrew, and St. Patrick, the patron saints of the three countries.*

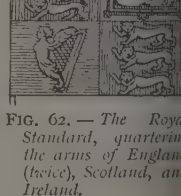


FIG. 62. — *The Roya Standard, quarterin the arms of Englan (twice), Scotland, an Ireland.*

land formed the borders separating the marches of the countries. The and Scots and English were, however, one in race and language. The n of the two crowns in 1603 was not followed by the union of the two iaments till 1707, and in 1800 the suppression of the Irish parliament the admission of Irish representatives to the British parliament brought it the present constitution of the United Kingdom.

People.—The first uniform census of the United Kingdom was taken 801 on the completion of the Union. Since that time the growth and redistribution of population have been remarkable.

Date.	Population of United Kingdom.	Density per sq. mile.	Percentage of population in England & Wales.	Ireland.	Scotland
1801	16,000,000	131	56	34	10
1901	41,600,000	344	78	11	11

The predominance of England is still more strikingly shown by the trade rns; but the union of the three countries is so complete, and the number cotsmen and Irishmen in England is so great that such comparisons are ecessary and even misleading. The British people at the present day mainly of Teutonic stock and English speech, the varieties of dialect ng mere survivals of former conditions of isolation. In 1891 not quite er cent. of the people were returned as speaking Keltic languages (half hem speaking Welsh, the others Irish and Gaelic) but only one-third nese (half a million people in Wales) were unable to speak English.

The people of the United Kingdom as a whole, although not so educated so disciplined as the Germans, and not so polished nor so thrifty as the nch, may be credited with perseverance, enterprise and powers of sical endurance beyond the average of mankind, and with a determined ependence of character. The valour of the British army, and especially splendid organisation of the British navy, have preserved the country n invasion and extended the area of the British Empire beyond all ers. The enterprise of British manufacturers, merchants and ship- ners, has gained a like pre-eminence over all other nations in trade and erial prosperity. Respect for law and love of justice are the most king characteristics of the nation. In the United Kingdom and the onies Law is recognised as the first power in the realm, and special visions have been made to prevent the Crown, the government, or the ed services from interfering with its impartial administration.

Government.—The United Kingdom is a constitutional monarchy, supreme legislative power being vested in a parliament, consisting of Sovereign, a House of Lords, most of the members of which are editary, and a House of Commons, consisting of 670 representatives ted by men who possess certain very general qualifications. Two- ds of the male population over twenty-one years of age are registered oters. The House of Commons alone has power over the national enditure; and it is only on rare occasions that either the House of ds or the Crown refuses to pass or to assent to any Bill passed by that

House. The executive power nominally vested in the Crown can practically only be exercised by the Cabinet, a committee of about twenty Ministers, who are responsible to Parliament and must resign when they lose the confidence of that body. The House of Commons—"the mother of parliaments"—is the pattern on which the legislative chambers of all democratic countries are based.

Elementary education is compulsory and free. The predominant form of religion is Protestant, except in Ireland, where Roman Catholics are in a large majority. In England the Anglican Episcopal Church is established by law, and in Scotland the Presbyterian Church. The established churches do not include a majority of the population, and membership of them confers no political or public privileges.

The British Empire is an unofficial name which includes the United Kingdom, the Indian Empire, and all the British colonies, protectorates and spheres of influence. The bond between the various parts is little more than community of sentiment, all the colonies in temperate regions being themselves self-governing countries, their people untrammelled by British legislation, but receiving the advantages of British citizenship and having the right of ultimate appeal in legal matters to the Judicial Committee of the Privy Council in London. The one material privilege within the empire not extended to foreign countries is the Imperial penny postage established in 1898. There is no compulsory military or naval service, and there are no protective duties on trade in the United Kingdom, although they exist—even against the mother-country—in almost all other parts of the British Empire. On account of the scattered nature of the empire and the vital importance of its foreign trade, the avowed defensive policy is to maintain a navy strong enough to secure the command of the sea. Permanent squadrons are stationed in the English Channel, the Mediterranean, the Pacific, and on the coasts of India, China, Africa, North America, South America, and Australia, and a system of fortified coaling stations makes it possible to send a British warship to any point on the surface of the ocean, and to prevent the war-vessels of any other nation from going far from home.

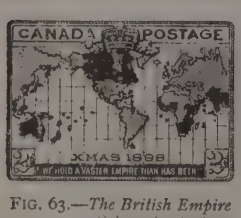
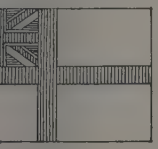


FIG. 63.—*The British Empire on a Colonial postage stamp.*

Economic History.—The Romans dealt with Britain as a colony by encouraging the growth and export of grain, developing the fisheries, and constructing trunk-lines of communications. They also utilised the mineral resources—the tin of Cornwall, the lead of the Pennine Chain, and the bog-iron ore which occurred almost all over the country. During the Saxon and the subsequent Norman periods the rearing of sheep for wool became the staple industry of England, there was little manufacture, and the country remained a producing area for raw materials. The "woolsack," the official seat of the Lord Chancellor as president of the House of

s, dates from this period. Later, when root-crops were introduced he methods of agriculture improved, the leading occupation became more grain-growing and cattle-rearing. As the country grew peaceful ecame an asylum for the oppressed industrial peoples of the continent, crafts of every sort, and particularly weaving, acquired importance, England began to export manufactured goods. Iron works were early lished in all places where ore was found in the neighbourhood of forests which charcoal could be made for its reduction. In the eighteenth century coal was discovered to be fit for use in making iron, and the first movement of iron-works to the coal-fields of the north commenced. The streams of the Pennine Chain, the Cotswolds, and other hilly districts were from early times utilised for the supply of mechanical power in mills. On the invention of spinning and weaving machinery in the eighteenth century new textile factories were started in the valleys of the northern rivers, and when at the beginning of the nineteenth century steam-power was introduced, the prosperity of the industrial villages ly situated on the coal-fields was increased, and the other manu- ring industries of the country were attracted to the same regions. quently the introduction of railways drew some of the manufactures to the great seaports; and now the use of electricity in manufactures estored and multiplied the value of water-power, and promises renewed erity to the highlands of high rainfall and full rivers. As the volume of anufactures swelled, the need for improved communication with sea- led to the initiation of the system of barge- s which make a close network over the l plain of England, and also cross the mid- plains of Ireland and Scotland. The intro- on of railways deprived the canals of their tance and introduced new adjustments of es of production. In every one of those ges the control exercised by geographical tions is to be traced, varying in its character one period to another.



4.—*The White Ensign e flag of the British y.*

FIG. 65.—*The Red Ensign—the flag of the British Merchant Service.*

p to the middle of the nineteenth century the agricultural produce e country nearly sufficed for the food-supply of the people; but e improvement in machinery and means of communication by land sea enabled the manufactures of imported raw material to be ased, and cheapened the cost of foreign food-supplies, from which rotective tariffs had been removed, agricultural labourers began to tracted to the factory work of the towns, land went out of cultivation e farmers found it impossible to compete with the cheap foreign corn, nany were driven to emigrate. The tide of emigration was enormously

increased in Ireland by the failure of the potato-crop, on which the peopl depended, and the result now is that all but a fraction of the food-suppl of the nation has to be imported and paid for in manufactured goods, o in services rendered by carrying on the shipping-trade of other countrie If supplies from over-sea failed the reserve of bread-stuff in the Britis Islands would not last for a month. This is the secret of the uniqu importance of foreign trade to the United Kingdom, and of the necessit for holding the command of the sea at all costs.

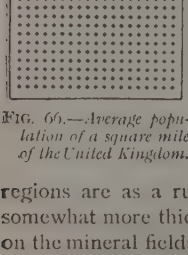


FIG. 66.—*Average population of a square mile of the United Kingdom.*

In 1891 one third of the British people abov ten years of age were engaged in manufacturing in dustries and less than one tenth in agricultural work

Distribution of Population.—The averag density of population for the British Islands wa 344 per square mile at the Census of 1901; but i England, which contains three-quarters of the whol population, the density is 558 per square mile. Th bare and unproductive Highlands are almost un inhabited, the density of population in Sutherland shire being only 11 to the square mile. The pastora regions are as a rule the most thinly peopled, the agricultural district somewhat more thickly, while an enormous density of population is foun on the mineral fields and in the neighbourhood of certain seaports (Fig. 18

Agriculture.—Three-quarters of England and Ireland, nearly two thirds of Wales, and one-quarter of Scotland are occupied as farms an pastures; more than half being pasture land. The grain most largel

Average population of a square mile—

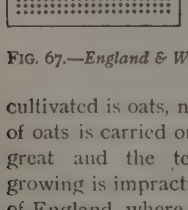


FIG. 67.—*England & Wales.*

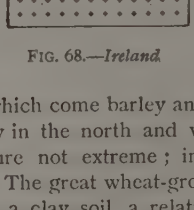


FIG. 68.—*Ireland.*

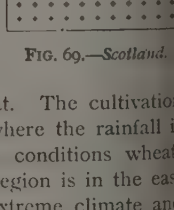


FIG. 69.—*Scotland.*

cultivated is oats, next to which come barley and wheat. The cultivatio of oats is carried on mainly in the north and west, where the rainfall i great and the temperature not extreme; in these conditions wheat growing is impracticable. The great wheat-growing region is in the ea of England, where there is a clay soil, a relatively extreme climate an small rainfall. Turnips and potatoes are the next most important crops the only industrial plant cultivated on a fairly large scale is flax in th north of Ireland. Hops are grown in Kent and some other parts of th

ntry, and apples in the west of England. Market gardens and fruit ns.—growing plums, pears, strawberries, gooseberries, &c.—are found r all large towns. The live-stock are principally sheep on hill pastures, le on the richer grass of the plains, especially in the districts of high fall, horses, and pigs. Dairy farming is important, but little attention iven to the rearing of fowls.

Fisheries.—The fisheries in the North Sea are of great value, but e on the west coast and in Ireland are comparatively neglected. Salted ings form one of the minor British exports. The introduction of steam lers has led to the concentration of fishermen at large ports with good vay facilities, such as Aberdeen and Grimsby, and to the gradual de- ulation of the fishing villages which formerly fringed the whole east south coast, thus reproducing the effects of the introduction of steam- er in manufactures.

Mining.—The extrac- of copper, tin, lead zinc is now quite in- ificant. Silver and l are obtained in small ntities, but the only al worth considering on, ten times more able in its annual duction than all the put together. It is ed mainly as clay- stone in the Cleve- district of Yorkshire. er qualities in smaller unt occur in the Coal sures, and can often mined together with coal; but the finest is the red hematite

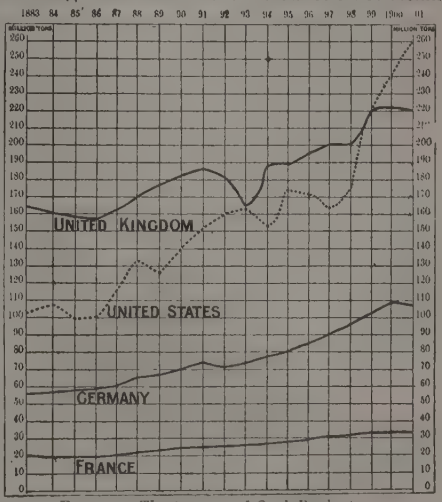


FIG. 70.—*The progress of Coal Production.*

he south-west and west of the Lake district. The great demand for requires so large an import of ore that more than one half (in value) rought in from abroad, mainly red hematite from the north of Spain.

Coal stands alone as the most valuable product of the United Kingdom, only commodity none of which has to be imported; and, at the present e, the material basis of the prosperity of the country. Its production increased with remarkable rapidity, only 82,000,000 tons having been duced in 1860. The recent output is compared with that of other ntries in Fig. 70. It is coal which makes it possible to purchase grain other food materials; not directly, however, for only 33,000,000 tons he 190,000,000 tons annually raised are exported; but indirectly by

supplying smelting furnaces for reducing iron and providing power for engineering works and factories. The outputs of coal in the four chief divisions of the country stand in the proportion of England 71 per cent., Scotland 15 per cent., Wales 14 per cent., and Ireland a minute fraction. The chief coal-producing districts are named in the following list with the output in 1896.

(1) *The Northern Coal-field* in Northumberland and Durham (42 million tons) near the Cleveland iron ore, is important mainly for the engineering works at Newcastle, and for export to Scandinavia and the Baltic.

(2) *The Yorkshire Coal-field* on the eastern slope of the Pennine Chain between the Aire and the Trent is shared by the East Riding, Nottingham, and Derbyshire (41 million tons). It supports the engineering works of Leeds and Sheffield, and is the seat of the woollen weaving industry.

(3) *The Lancashire Coal-field*, lying symmetrically on the west side of the Pennine Chain (23 million tons), only supplies the engineering works and cotton factories of Lancashire centred round Manchester.

(4) *The Staffordshire Coal-fields*, raising 13 million tons, furnish supplies to two industrial districts, the "Potteries" and the "Black Country," where the iron industry and metal manufactures centre in Birmingham.

(5) *The South Wales Coal-field* (32 million tons) stretches into the county of Monmouth, and supplies the iron and copper furnaces of Cardiff, Merthyr Tydfil, and Swansea. The coal is mainly anthracite, of great value for producing intense heat with no smoke, and fully one-half of the supply is exported for use on steamers in all parts of the world.

(6) *The Scottish Coal-fields* (29 million tons) scattered throughout the central lowlands, touch the sea on the Firths of Clyde and Forth, exporting to Ireland and the Baltic. They supply the iron furnaces near Glasgow and the steel shipbuilding yards on the Clyde.

Seaports.—The present commercial supremacy of the United Kingdom is not due to the number and commodiousness of its natural harbours, although this is frequently stated. The best natural harbours are remote from the regions of dense population and they are not useful. Another common error is to ascribe the great trade to the fact that the south of England is nearly in the centre of the "land hemisphere"; but if this were a potent factor it would act much more powerfully on the trade of France, which possesses by far the most central position on the ocean routes of the world. The real reason must be sought in the spirit of the British people, and in the abandonment of protective tariffs, making it necessary to import food and raw material, and to pay for imports by trade. Eight groups of ports carried on between them 80 per cent. of the trade of the United Kingdom with foreign countries in 1896.

(1) *London*, with about 16 million tons of over-sea shipping, owes its pre-eminence to the historic continuity of the capital as the chief nucleus of population, and to its now being the centre of means of distribution inland. The exports are inconsiderable.

) *Liverpool*, with a movement of 12 million tons, is unique amongst
h seaports for its practical monopoly of the American and West
an trades, especially in the import of food and raw material, chiefly
n, and for its export of manufactured goods and machinery. The
ur is an estuary deepened and kept open at great cost.
) *Cardiff* (including Barry Dock), with 12 million tons of shipping,
ers by the enormous export of coal from the South Wales coal-field.
) *The Tyne Ports*, including Newcastle and North and South Shields,
a movement of 9 million tons, mainly exporting machinery and coal.
) *Hull and Grimsby*, on the Humber, with about 7 million tons of

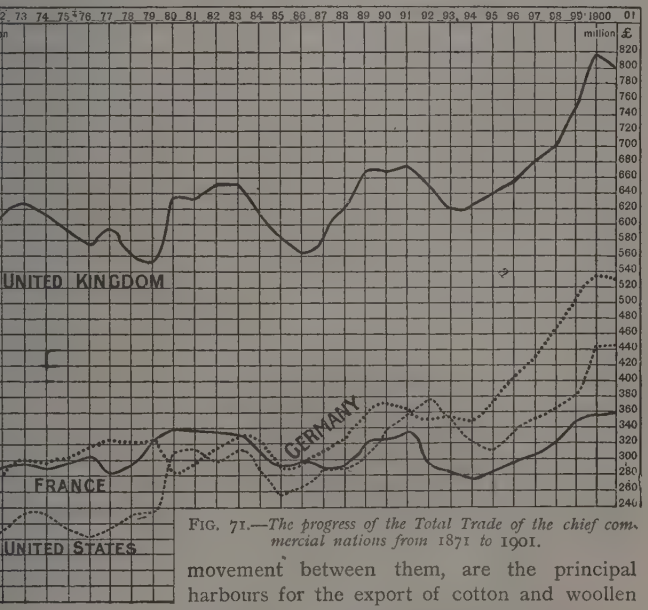


FIG. 71.—*The progress of the Total Trade of the chief commercial nations from* 1871 *to* 1901.

movement between them, are the principal harbours for the export of cotton and woollen goods to the continent of Europe, and in a r degree for the import of continental produce.

) *The Firth of Forth Ports*, Leith, Grangemouth, and Kirkcaldy between them about 6 million tons of movement, mainly exporting

) *Glasgow*, with a movement of 3½ million tons, is an artificial port he Clyde, ocean steamers now coming to a point where fifty years children could wade across at low water. The trade is largely in im- of ore and raw materials, and the export of iron and manufactured s.

) *Southampton*, with a movement of 3 million tons, is mainly con-

cerned in the passenger trade to South Africa and America ; its proximi to London by rail enabling it to compete in this respect with Liverpool.

It will be noticed that almost the whole trade of the United Kingdo with other countries is carried on in four inlets of the east coast (t Thames, Humber, Tyne, and Forth) three on the west coast (the Bris Channel, Mersey, and Clyde) and one on the south coast. But in additi the importance of Dover, Folkestone, Queenborough, and Harwich passenger and light cargo ports for cross-channel trade must be reme bered. The coasting shipping of the country is also greatest in t harbours which concentrate the over-sea trade, and its volume is about t same. Fully 1,000 vessels enter the ports of the United Kingdom daily.

Trade.—The value of the exports and imports is nearly twice as gr as the average of that of the three countries which come nearest to Germany, France, and the United States (Fig. 71). The merchant fl amounts to more than half of all the vessels afloat, and their tonna much exceeds that of all the ships of other nations in the world.

The annual trade of the country (exports and imports) averages mo than £700,000,000, or £18 per head of the population. The value of t exports of British goods is scarcely more than half that of the imports proportion which prevails in no other large country. The imports cons mainly of food and of raw materials, the exports mainly of manufactur articles as nearly as can be ascertained in the following proportions :—

	Food material.	Animals.	Raw materials.	Manufactures.	Total.
Imports	40·7 ..	2·5 ..	35·3 ..	21·5 ..	100
Exports	5·3 ..	0·4 ..	7·8 ..	86·5 ..	100

Most trade is done with the other British possessions, the United Stat France, Germany, Holland, Russia, and Belgium, in the order given ; t British possessions are relatively the most valuable as a market for expor

Railways were first introduced in the United Kingdom, and th remain in the hands of a few great companies ; but the telegraph syste also the first to be established in the world, has been incorporated with t Post Office, the only State monopoly.

II.—SCOTLAND

By Hugh Robert Mill, D.Sc.

General Characteristics.—North Britain is divided naturally i three parts—the Highlands to the north and west, the Central Lowlan and the Southern Uplands to the south and east. The boundaries of the areas are marked by nearly straight parallel lines of faulting running fr north-east to south-west (Fig. 72). Between these faults the crust-blo of the Central Lowlands has gradually sunk, protecting the Carbonifero strata, while those of the Highlands and Southern Uplands have be elevated on either side, and the very ancient rocks exposed by denudati The existing scenery of Scotland, perhaps more than the other parts of t

h Islands, shows traces of the Glacial Period, when the land was buried , the movement of which polished and striated the rocks of mountain valley alike, and covered large parts of the country with masses of ler clay. This gives a gently undulating character to much of the al Lowlands, and has, by filling old river channels, caused a rearrange- of many of the river courses. The work of frost and rain has d the Highland summits into characteristic forms of rugged strength.

of the most recent geological features e series of raised beaches which sur- l Scotland. Of these the most im- nt is a horizontal terrace about twenty- eet above sea-level, sometimes cut in solid rock, more often built up of les and clay, which furnishes the sites most all the coast towns.

FIG. 72.—*Natural divisions of Scotland.*

istory and People.—The Scots, a c race from Ireland, entered the ry from the west, gradually over- d it in the fifth century, and con- ed the earlier Picts. It was not until the tenth century that the English iage in its Northumbrian form was established on the Lowland plain and unassimilated Gaels began to draw within the Highland border. There clans lived under their chiefs as a typical race of mountaineers, at war with each other, and as distinct in dress and language their fellow-countrymen in the Lowlands as from their national ies in England. The suppression of the rebellion in 1745 broke ne Clan system finally, and since that time the Gaelic language been less and less spoken. The eastern portion of the Lowland formed for a long period a part of the kingdom of Northumbria, n spread from the Humber to the Forth; but the bare hills of Southern Uplands were a barrier to the easy communication neces- to maintain cohesion in unsettled times, and well suited to form marches or borderland between two States. The fertile carse-lands of astern firths naturally became the heart of the kingdom of Scotland. long-continued wars with England drove Scotland into closer associa- with continental countries, the influence of France being very marked several centuries. For a century after the union of the crowns Scot- retained its own parliament, and was separated from England by oms barriers for a longer period. The opposition of English mercan- corporations hampered Scottish trade, and brought disaster on the did though premature project of colonising the isthmus of Darien in to command the trade of the Pacific. With the union of the parlia-

ments the economic development of the country really commenced. A present the chief external difference between Scotland and England lies some details of law and the administration of justice, and in the establis ment of a Presbyterian church. The national character is marked a distinctive. The Highlander is constitutionally courteous, poetical, a open-handed, and prefers an occupation involving occasional calls f severe exertion with longer intervals of inactivity, such as fishing and cat rearing. The Lowland Scot, on the other hand, is sometimes surly b always independent, persevering, and determined in his undertakings, a given to agriculture, manufactures, and trade. As a consequence of t adverse conditions against which his race has so long struggled he is oft more thrifty than generous. Since John Knox inaugurated the pari schools at the Reformation three centuries of practically universal educ tion have given the Scottish peasantry a bent for study and a taste for serio reading which make the Scottish universities perhaps the most numerous attended in Europe.

The Highlands.—The north-west of Scotland bore the brunt of t compressing forces in the Earth's crust by which the European contine was ridged up from the Atlantic depression, and its geology is consequent very complex. Since the up-ridging, continual erosion has worn dow many of the islands of the outer Hebrides to a low level, although compos of the hard Archæan gneiss. Great volcanic disturbances also occurr through many geological ages, resulting in the outpouring of lavas and t injection of sheets of molten rock, which denudation has uncovered a rendered conspicuous. The average level of the Highlands is about 1,5 feet above the sea, although in parts they rise to nearly three times th height. There is no mountain range. The surface has been carved b rivers and atmospheric erosion into masses, which looked at from belo have the appearance of mountains; but viewed from one of the highe summits the Highlands appear as round-shouldered and flat-topped moo lands covered with moss or heather or shattered stones. They are fairly uniform general height and rise without definite order like waves a stormy sea. They are, in fact, the product of a deeply incised system valleys impressed upon an ancient plateau, the recent depression which on the west has formed the islands. Highlands and islands togeth comprise 70 per cent. of the area of Scotland, but only contain 23 p cent. of the population. Most of the crofters who formerly made a pr carious living by farming in the valleys have been compelled to migrate more fertile lands or engage in more profitable callings. The high rainfa of the west, the raw climate, and the poor soil of the crystalline rocks uni to make agriculture impossible; and the Highlands have relapsed into t condition of a wild country, useful mainly as a game preserve, and no for the most part the property of wealthy Englishmen and American Sheep farming on a large scale is still carried on, but deer forests a more profitable. The population is almost entirely confined to the low

arts of the valleys where they come out on the Lowland plain or on the ea. The roads through these valleys are now in many cases superseded y railways carrying the yearly swelling tide of sportsmen and lovers of ne picturesque to moor, mountain, and loch. Whisky distilling is a ypical Highland industry; the most famous distilleries are often situated small villages, and *Campbellton* in Cantyre is almost the only town of hich distilling is one of the chief resources.

The North-Western Highlands and Islands.—Some of the kes in the western valleys are of remarkable beauty, especially those in ne west—Loch Maree, Loch Shiel, and Loch Morar, the last being the eepest lake in the British Islands (maximum depth 1,070 feet). The icturesque masses of volcanic rocks forming Skye, Mull, and the smaller lands of the Inner Hebrides are separated from the mainland by rowned valleys. The population is found chiefly on the fertile wedge of ld Red Sandstone lowland surrounding the Cromarty Firth on the east oast. The Highland railway winds its way northward along the east oast, and a branch line from *Dingwall* at the head of the Cromarty Firth uns across to Strome Ferry on Loch Carron, whence steamers ply to the erring-fishing port of *Stornoway*, in the island of Lewis in the Outer ebrides. Part of Inverness and the county of Ross and Cromarty united ccupy most of the area; but Sutherland (the Southern Land of the old orsemen), includes the northern end of the Highlands.

The Northern Lowlands and Islands.—Beyond the north-western ighlands the Old Red Sandstone plain of Caithness is really a detached ortion of the fertile Lowlands, better cultivated and more densely peopled an the Highland counties. The coast scenery is fine, and the fisheries nportant, especially at *Wick*, for herrings. From *Thurso* the mail steamer ails for Orkney. Orkney and Shetland, though forming one county for arliamentary purposes and having come under the Scottish crown together n 1590, are entirely distinct. The **Orkney** islands are a continuation of ne Old Red Sandstone plain of Caithness, separated from it by the Pent-nd Firth, their only striking scenery being on the coast. The tide rushes riously through the narrow sounds which separate the numerous islands; nd the Orkney people are very skilful boatmen. Sheep are raised, and shing and some woollen manufactures are carried on. *Kirkwall*, on omona, the largest island, is the chief town. The **Shetland** group, fifty iles north-east of Orkney, are much more varied in character; their rocks esemble those of the Highlands, and the people are of more exclusively candinavian origin, their dialect containing many words still current in celandic. With a climate like that of the Færoes the productions are milar; small shaggy ponies and sheep are reared, there is a good deal of shing and whale hunting, and a considerable home industry in knitting ne fine native wool. *Lerwick*, on Mainland, is the only town. It used to e the last port touched at by Arctic whalers, a large proportion of their rews being Shetlanders; and the islands still produce many sailors. Fair

Isle, half way between Orkney and Shetland, has an important lighthouse.

The Great Glen and South-Eastern Highlands.—The long, narrow valley of Glen More (*i.e.*, the great glen), separates the north-western from the south-eastern Highlands by the clear-cut line of an ancient fracture. The centre of the rift is occupied by a series of long, narrow lakes of great depth, which never freeze, Loch Ness, Loch Oich, and Loch Lochy. They are joined by the Caledonian canal, which is now of value only as a tourist route. The historical importance of this valley is attested by the growth of *Inverness* at its north-eastern outlet. The continued prosperity of Inverness is due not so much to the beauty of its situation as to the fact that it stands at the crossing of the tourist routes of the Highland railway and the Caledonian canal. It has become a distributing centre for the whole north of Scotland, and a noted sheep market. The names of three old military posts recall the strategic value of the Great Glen in the past : *Fort William*, established at the west end of the Glen in 1655 ; *Fort Augustus*, in the centre, after the rebellion of 1715 ; and *Fort George* at the east end, after the rebellion of 1745. Ben Nevis (4,406 feet), the highest point in the British Islands, is crowned by a meteorological observatory. The Falls of Foyers on Loch Ness have been utilised for the production of electric power for an aluminium factory, a foretaste of the possible revival of Highland industries by modern methods.

The highest land, representing the ridge of the old plateau, is marked by the granite masses of Ben Nevis and Ben Macdhui (4,300 feet), in which the longest rivers in Scotland originate. The Spey runs north-eastward to the Moray Firth ; the Dee and Tay (the latter carrying the outflow of the large lakes — Lochs Ericht, Rannoch, Tay, and Earn) flow to the east and south-east. Their valleys furnish the only lines of communication for roads or railways across the Highlands. The large Loch Awe of the west resembles in a general way the salt water fjords of Loch Etive and Loch Fyne between which it lies. From the Central Lowlands the edge of the Highlands presents an imposing appearance like a line of mountains rising from the plain, and to this edge the name of the Grampians has been vaguely applied. Near the great fault separating the Highlands from the Lowlands, small earthquakes are common, a sign probably that the strata are still yielding to the internal stresses.

South-Eastern Highland Counties.—The county of Inverness occupies the north, that of Argyll the whole west, and Perth the south of this division of the Highlands. The northern slope to the Moray Firth terminates in a narrow coastal plain shared by the counties of Nairn, Elgin, and Banff. Thanks to the porous soil of the west of this plain, and its sheltered position, it possesses a remarkably dry and mild climate. Where the coast turns to face the east, and the Highland schists and granites reach the sea in grand cliffs, the seaport of *Peterhead* was long famous for its Arctic

whaling fleet. The exposed bay is being converted into a great harbour of refuge for the east coast by the construction, with the aid of convict labour, of huge breakwaters which will not be completed until 1921. *Aberdeen*, the largest town on Highland soil, owes its prosperity in part to the quarries of fine grey granite, of which the whole city is built, in part to its ancient university, but mainly to the harbour, which, in spite of an awkward bar at the mouth of the river, is growing in importance. It is concentrating the fishing industry, now largely carried on by steam trawlers, and gradually attracting it from the small fishing towns along the coast. This is, in part, due to the good railway service to London (500 miles in eleven hours), with which Aberdeen also does a large trade in fresh beef, the cattle of the district being renowned.

The Central Lowlands.—The Central Lowlands are on the whole under 500 feet in elevation, the lowest divide between the North Sea and Atlantic being only 200 feet above sea-level. The Firth of Clyde, on the west of the plain, is connected with a series of long fjords running northward and north-eastward into the Highlands, but receiving no streams of any length. Loch Lomond, picturesquely situated near the west coast on the edge of the Highlands, combines the character of a highland valley loch with that of a lowland lake, Loch Leven in Fife shows the latter type alone. The lower ground is composed of the Old Red Sandstone formation on the northern and southern margins, with Carboniferous strata in the centre containing numerous detached basins of the Coal Measures. Great accumulations of volcanic materials form ranges of hills parallel to the general lines of the country, especially the Sidlaws, Ochils, and Campsie Fells on the north, and the Pentlands, and Lammermoors on the south. The Lowland plain contains much more than half the population of Scotland; for on account of its diverse natural advantages it has always been the richest part of the country. The fertility of the soil, and the development of the most advanced scientific farming, enables remarkably heavy crops to be raised. The iron and coal-fields have fixed important industries, and caused the growth of many active towns, knit together by a close network of railways.

The Highland Border.—The county of Perth, almost co-extensive with the drainage area of the river Tay, includes the system of converging river valleys which drain the southern Highlands, and bring all the lines of communication with the north to a focus at the city of Perth, where it stands on a flat plain bordering the Tay at the head of the tide. *Perth* has always been important on account of its commanding position; for from it diverge the roads (and now the railways) to the Highlands by the valley of the Tay, to Aberdeen by the plain of Strathmore north of the Sidlaws, to Dundee by the fertile Carse of Gowrie, to Stirling by the Allan valley skirting the Ochils on the west, and to Edinburgh by the pass of Glenfarg across the Ochils, through which the construction of the great Forth Bridge has restored modern traffic to the old coach route. Besides its importance

as a railway centre, there are some industries, especially extensive dye-works. *Stirling* grew round the steep basaltic crag on which its castle stands commanding the lowest ford on the river Forth, close to the head of navigation, and at the point where it could first be bridged. Stirling Bridge was for centuries the key to the Highlands, and the immediate neighbourhood was consequently the scene of many battles, chief amongst them that of Bannockburn in 1314, when Scottish independence was finally assured. *Dundee*, with the only harbour for sea-going vessels on the Tay estuary, is a commercial and manufacturing town. As a linen-weaving centre dependent on Russian flax the Crimean war nearly ruined it; but the timely introduction of Indian jute more than compensated the temporary loss, and the American civil war, by stimulating the production of all other textiles than cotton, confirmed its prosperity. Dundee has famous jam factories, partly supplied by the fruit farms of the Carse of Gowrie, and it is the only port of the United Kingdom still sending out a fleet of Arctic whalers. The Tay Bridge, two miles in length, gives direct communication with the south *viâ* the Forth Bridge.

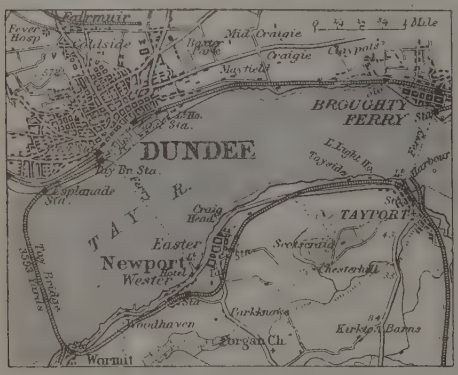


FIG. 73.—*Dundee and the Tay Bridge.*

The Eastern Lowland Towns. — The peninsula of Fife between the Firths of Forth and Tay was compared by James VI. to "a beggar's mantle fringed with gold" on account of the number of prosperous seaports along its coast. There are still many fishing villages, but the only harbours for steamers are *Burntisland* and *Kirkcaldy*, the latter the chief centre of linoleum manufacture in Great Britain. The ancient city of *St. Andrews*, with the oldest university in Scotland, founded in 1411, stands on the shores of a sandy bay in the extreme east, where the links made it famous centuries ago, as it is famous still, for the "royal and ancient game" of golf. *Edinburgh*, originally a castle on a lofty crag (see section from west to east in Fig. 25), grew into a walled town, the one street of which, with branching "wynds" and "closes," descended the steeply-sloping "tail" to the later palace of Holyrood. Within the last century the space around the castle and Calton Hill has been laid out in streets and squares which stretch to the shore of the Firth of Forth, and suburbs also spread far to the south. Edinburgh retains the supreme courts of Scotland, and other survivals of its life as a capital.

The university is the youngest in Scotland (1582), and is renowned mainly for its medical school. Book printing and brewing are among the more important of the industries of the town. As the headquarters of many banks and insurance offices it is of financial importance, and the General Assemblies of the Scottish churches make it an ecclesiastical centre also. The grandeur of its site, and the bold design and fine architecture of the streets and public buildings, make it in the opinion of many the finest city in Europe. The adjacent seaport of *Leith* does a large shipping trade.

The Western Lowland Towns.—The centre of the Lowland plain is engaged in the characteristic industry of oil-shale mining, and the distillation of paraffin. Further west the coal-mines yield more than half the output of Scottish coal-fields, most of which is employed in the many

FIG. 74.—*Edinburgh and the Forth Bridge.*

manufactures of the densely peopled counties of Lanark and Renfrew. The black-band iron-stone occurring with the coal gives employment to the blast furnaces of Hamilton, Wishaw, Coatbridge, Kilmarnock, and Cumnock. The industry of the region is concentrated on the upper estuary of the Clyde where *Greenock* is an active seaport with ship-building yards, and *Paisley*, though standing back from the river, is even more prosperous through its great manufactures of cotton thread. *Glasgow* is one of the most ancient cities in Scotland, and the seat of an old university. At one time its importance, like that of Perth, lay largely in its situation on the border of the Highlands, but its present prosperity, which has made it the largest British city next to London, is due to the artificial deepening of the Clyde, commenced in 1768. The proximity of iron and coal promoted manufactures of every kind, the navigable waterway enabled trade-relations

to be established with America and India, and the introduction of steam in navigation, and of iron and then steel in naval construction united these advantages. Steel ship-building is the most important industry of the Glasgow district, and the Clyde is the greatest ship-building centre in the world. Locomotive works, chemical works, and potteries, as well as textile factories of all kinds, employ the large industrial population. The city of Glasgow is one of the most progressive municipalities in the United Kingdom. The water supply is drawn through a tunnel 34 miles long from Loch Katrine.

The Southern Uplands.—The Southern Uplands rising steeply from the Lowlands form a region of round-topped hills of Silurian formation, usually richly grassed to the summit. The general character is that of a plateau deeply trenched by valleys, with an average height of perhaps 1,000 feet and only 2,700 at its highest point—Mt. Merrick. The Tweed flowing east by south is the principal river, and its lower valley forms a flat plain of considerable extent near the coast. The Clyde, rising near the source of the Tweed, flows on the whole west by north to its estuary in the Central Lowlands. The Annan and other short streams flow to the Solway Firth. The south-western corner of the Uplands is its highest and most rugged part, forming the district of Galloway. It is mainly a land of sheep farms, and in proportion to the area Roxburgh, Selkirk, and Berwick contain more sheep than any other counties in the United Kingdom. The sheep are usually of the Cheviot breed, celebrated for their fine wool, and the towns of the Tweed valley, especially *Galashiels*, have long been prosperous through the weaving of strong woollen cloth. The old divisions of the border country were the dales or valleys of the rivers which formed the natural highways and contained the best farming land.

FIG. 75.—*Glasgow.*

Railways from England enter the Uplands at Berwick on the east, winding round the coast to Edinburgh, and from Carlisle on the west, whence one line of the Glasgow and South-Western railway runs round the coast to *Stranraer* on the shortest sea-passage from Great Britain to

reland. Another passes *Dumfries* and goes up Nithsdale, descending to he coastal plain, and passing *Kilmarnock* to Glasgow. The Caledonian ailway passing *Gretna Green* (formerly famous for the celebration of run-way marriages, as it was the nearest point to England where the Scots w could be taken advantage of), ascends the valley of the Annan and escends that of the Clyde to Glasgow. The North British "Waverley oute" passes up Liddesdale and descends the valley of the Teviot, rossing the Tweed at *Melrose*, and running thence direct to Edinburgh.

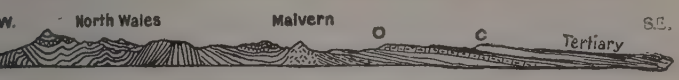


FIG. 76.—*Section across England (after Ramsay). The letters* o *and* c *indicate the Oolitic and Chalk escarpments.*

III.—ENGLAND AND WALES

By Hugh Robert Mill, D.Sc.

Natural Divisions.—A bold contrast presents itself between the cenery and structure of the country to the east and to the west of a slightly urved line, convex to the ast, drawn from the mouth of he Tees in Durham to the outh of the Exe in Devon. his is not an "imaginary ne" but a distinct height of nd, the Oolitic Escarpment, orming a watershed through-ut its whole length, except in ne point where the Humber stuary breaks through it. he western hills are lofty, sing like islands out of the ow plain which surrounds hem, and often wild and ugged like those of the High-nds, contrasting with the ow and gentle downs and es-arpments of the eastern low-nd. The western rocks are or the most part of Palæozoic r igneous formation, occur-ng in irregular and confused asses, in contrast to the uniformly overlapping sheets of little-disturbed econdary and Tertiary formations to the east. The western region alls into four fairly definite physical divisions which have also a cer-

FIG. 77.—*Natural Divisions of England and Wales.*

tain historical and industrial individuality, the *Lake District*, *Wales*, the peninsula of *Cornwall and Devon*, and the *Pennine Chain*, to which may be added the *Central Plain* which surrounds and separates them. The eastern region is less sharply subdivided, into the *Jurassic Belt*, the *Chalk Country* which is broken by the *Fenland* and the *Weald*, and the *Tertiary Basins* of Hampshire and London (Fig. 77).

General Characteristics.—England is distinguished from Scotland and Ireland by the more purely Teutonic descent of its people. The Saxon type is still to be seen in great purity in the southern and eastern counties, even traces of the old German language remain amongst the peasants, who in Sussex still use "Ya" (the German *Ja*) for "Yes." The local dialects of most parts of the country are distinctive, but not so different as to hinder free intercommunication. The whole of England and Wales is divided ecclesiastically into two Provinces presided over by the Archbishops of Canterbury and York, and into thirty-two Bishoprics, each with its cathedral city. The rank of *city* in England is only given to the seat of a cathedral. The forty "ancient counties" or shires into which England is divided, represent very early divisions of the old Anglo-Saxon kingdoms, which coalesced to form the realm of England. Few of them have natural boundaries; but it is interesting to notice as exceptions that the Thames separates counties along nearly its whole course, the Tamar, Tyne, and Tees are also county boundaries, and Yorkshire consists almost exactly of the basin of the Ouse. For administrative purposes the larger counties are subdivided, and large towns as a rule are counties in themselves. The County Council is the chief local government body. The character of the English people is the foundation of that of the British nation. The sense of justice is strongly developed, and the love of "fair play" for friends and enemies alike is perhaps the real basis of British greatness; but this feeling is combined with a strenuous determination to uphold rights: "Dieu et mon droit" is not inaptly the national motto. New ideas are slowly received, but once accepted they are strongly held. Interest in manly sports is deeply rooted and forms the strongest bond between all classes of the community.

The Western Division.—In the time of the Roman occupation the mountainous region of Britain west of the Severn, including the peninsula of Cornwall and Devon on the south, and the Lake District and Southern Uplands of Scotland on the north, was occupied by Keltic tribes, amongst whom the *Brythonic* or *British* predominated over the Gaelic and other elements; so the Gaelic language does not occur in Wales. The people called themselves *Cymry* (*i.e.* fellow-countrymen), hence the name of *Cumber*land. *Wales* is from a Saxon word meaning "foreign," and the name reappears in *Cornwall*. The tribes were organised in warlike clans, the chieftains sometimes united under a common head, more frequently at war with each other, and they resisted conquest until the Norman period. The northern districts have now completely lost their Keltic population and language,

and so has the southern peninsula, although the old Cornish language lingered there until the eighteenth century. Wales was incorporated with England in the fourteenth century, yet the Welsh language has survived, and one-third of the people of the principality can speak no other. The Welsh are lovers of music, the harp being a favourite instrument.

The Lake District.—The Lake District forming a peninsula between the Solway Firth and Morecambe Bay, and separated from the Pennine Chain by the valleys of the Eden and the Lune, is a small rugged highland trenched by deep and picturesque valleys which radiate in all directions from a central point. Each long valley contains a narrow lake-bed; but some have been separated into two by silting up like Derwentwater and Bassenthwaite, or Buttermere and Crummock, others like those of Langdale have been entirely drained or filled up and converted into meadows. The largest remaining lakes are Windermere running south, and Ullswater running north-east. Scafell Pike, above Wastwater, the deepest lake, is the highest mountain in England (3,200 feet); Skiddaw in the north, and Helvellyn in the east also exceed 3,000 feet. Geologically the Lake District consists of a central mass of Silurian volcanic rocks, with sedimentary strata of the same age, to north and south; surrounded by a ring of Carboniferous limestone, with Coal Measures on the north-west, and a broken rim of newer rocks—the New Red Sandstones—outside the whole.

In the central valleys the population has always been sparse, the extremely wet climate makes agriculture impossible, and only a few cattle and sheep are kept. Plumbago mines in Borrowdale gave rise to the manufacture of pencils at *Keswick*, and this industry continues although the mines have been exhausted; graphite is now imported from Ceylon, and the cedar for the sticks is brought from Florida. The romantic beauty of the Lake District attracted attention about the middle of the eighteenth century, and ever since it has been a haunt of tourists. It is a favourite residence for poets, artists, and men of letters, who have striven to introduce home industries in order to retain the small population in their native dales. On the outer margin coal is mined, and the remarkably pure hematite iron ore has caused the artificial harbour of *Barrow-in-Furness* to spring into prosperity in the south-west. The heavy rainfall of the district is utilised by the conversion of Thirlmere into a reservoir for the water supply of Manchester, and some of the streams are utilised for producing electrical energy.

Wales.—Wales as a physical region comprises the peninsula between the estuary of the Dee and the Bristol Channel, and extends on the east to the Severn valley, but the counties of Cheshire, Shropshire, Hereford, and Monmouth have long ceased to be Welsh; Monmouth is, however, usually classed with Wales for statistical purposes. The very ancient rocks known as Cambrian and Silurian were called after the land of the Cymri and Silures, and they form the main bulk of the dissected highland of the peninsula. The north-western and south-western extremities are rendered more resisting by intruded igneous sheets and dykes, and consequently

project boldly, while the more yielding rocks between them have been cut back into the harbourless Cardigan Bay. In Anglesea and Carnarvon on the north-west, the strata and their igneous intrusions run in narrow bands from north-east to south-west. One of these bands gives origin to the channel of Menai Strait which, like that cutting off Holy Island on the west, is so narrow that the harbour of *Holyhead*, lying nearly on the straight line joining London and Dublin, can be reached by rail, and thus used for the mail route to Ireland. Masses of igneous rock have given rise to Snowdon, the highest mountain in Wales (3,570 feet) and other high summits in the neighbourhood, as well as to the fine ridge of Cader Idris (2,930 feet) further south. The slate mountains of North Wales are very extensively quarried, and keep several small seaports at work, as no slate of equal quality is found elsewhere in the British Islands. Both the north and the west coasts of Wales attract many residents and summer visitors on account of their combination of mild climate and fine scenery. In Pembroke on the south the hard igneous rocks run in narrow bands from east to west, and there Milford Haven, the only fjord-like inlet of the coast, is a magnificent natural harbour. Because it lies farther from coal than the tidal harbours of the Bristol Channel, and is remote from the great centres of manufacture and population, it is only beginning to be utilised as a trans-Atlantic shipping port. Around the very ancient rocks of Wales there are several patches of the Coal Measures contained in basins or synclinal troughs. One detached basin runs south from the estuary of the Dee in the north, and others of smaller size appear in the Severn valley, at Coalbrookdale, the Forest of Wyre and the Forest of Dean, each supporting a group of small but busy mining and manufacturing towns.

The South Wales Coal-field.—One great geological basin fills the south and east of Wales, in a synclinal hollow of the ancient Silurian strata, the upturned edges of which running to the north-east originate the striking scenery of Wenlock Edge, and on the east form the singularly graceful line of the Malvern Hills. Within this rim there is a great expanse of Old Red Sandstone rising on the west into the Black Mountains, and reaching an altitude of 2,900 feet in the rugged and barren Brecon Beacons. On the east the Old Red Sandstone sinks to form the low sheltered and exceedingly fertile plain of Hereford bearing the finest orchards in England, and hop gardens rivalling those of Kent. It is watered in the south by the Wye, the most picturesque of English rivers. The plain was formerly of great strategic value, as it commanded the passes into Wales, now its importance appears in providing a "west and north" railway route, in conjunction with the Severn tunnel, from Bristol to Crewe, converging at Shrewsbury with the route by the Severn valley. Within the Old Red Sandstone, between the Brecon Beacons and the Bristol Channel, the Carboniferous rocks are held as in a cup. The South Wales coal-field has an area of 1,000 square miles, and is shared mainly by the counties of Glamorgan and Monmouth. Its perfect basin shape is shown

the outcrop all round it of the bent-up edges of the Millstone Grit, the rewell rock" of the miners, and the Carboniferous limestone, which lie der the coal. The Coal Measures form a plateau which descends m an elevation of about 1,200 feet in the north to 700 feet in the th, and then sinks to a coastal plain of newer rocks. It is trenched remarkably steep-sided and deeply-cut valleys running southward almost allel to one another. The coal seams crop out along the sides of these leys, the floors of which are traversed by railways and lined with mining ages, contrasting with the nearly uninhabited uplands between them. e railways converge on the east to the Ebbw valley, at the confluence of ich with the Usk the ancient town of *Newport* has become a modern l-shipping port; and on the west to the far more important Taff valley. here the Taff enters the coal-field on the north a little village took the ne of *Merthyr-Tydfil*, from the martyrdom of an early Welsh princess med Tydfil. In the middle of the eighteenth century coal mines and n works were established re, and a large though un-tending town has grown on oor site over 500 feet above sea. The neighbouring leys of the Cynon and the ondda converge to the Taff, l the output of the whole es by the Taff Vale railway *Cardiff*, where there are great cks rendered accessible at gh water to the largest vessels the high tides of the Bristol annel. Cardiff is the seat of numerous manufactures, mainly connected th iron and tin-plate. Some miles to the west a desolate sandy tract coast was made the site of a large artificial harbour, *Barry Dock*, in 1889, ich now exports an enormous amount of coal, and is the centre of a nsiderable town. *Swansea* farther west has long been engaged in pper-smelting, ore being imported from all parts of the world, and it is o one of the chief manufacturing places for tin-plate. This industry is ried on in villages in all the valleys of South Wales, the locality being ginally determined by the proximity of the coal-field to the Cornish -mining district, although now most of the tin is imported from ngapore.

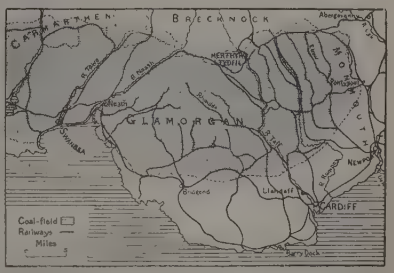


FIG. 78.—*The South Wales Coal-field.*

The Severn Valley.—The rivers flowing down the steep northern, uthern, and western slopes of the Welsh highlands are short and swift. the eastern slope the Dee flows out of Bala lake at the base of the lminating volcanic mass of North Wales, and turns northward to eander over the Cheshire plain. The Vyrnwy, rising close to the source the Dee, fills an artificial lake formed by the Liverpool water-works in

an ancient lake-bed, in the desolate pastoral region of central Wales and flows to the Severn. This river, rising farther south and west, sweeps across and around the margin of the ancient rocks to flow southward down its broad valley over Triassic strata, collecting the whole drainage of the eastward slopes of Wales, and receiving only one important tributary, the Avon, on the left from the Central Plain of England. The names of Gloucester, Worcester, and Chester testify to the military importance the Romans attached to the line of communication through the Severn and Dee valleys, flanking Wales. The fine cathedrals of Gloucester, Worcester and Hereford afford evidence of the value of the Welsh border when agriculture was the one source of wealth, and they all continue to be thriving market towns and the seat of various minor manufactures. *Gloucester* is made accessible to ocean-going vessels by a ship canal from the Severn estuary. The commercial importance of this estuary was anciently due mainly to *Bristol*, which grew up as a seaport on the southern Avon, and in the fourteenth century was second only to London. From this port Cabot sailed on his voyage of discovery westward, and a great trade with America was kept up for two centuries in sugar and tobacco; the tobacco trade still continuing important, as well as that in chocolate and in timber. The first steamer to cross the Atlantic sailed from Bristol in 1838, but the introduction of steam has benefited other seaports more, and for a time it declined in importance. There are considerable manufactures, coal being obtained from a small coal-field in the neighbourhood. A tunnel four and a half miles in length, the longest in England, under the Severn, connects Bristol with South Wales.

The Cornwall and Devon Peninsula.—The peninsula of Cornwall and Devon forms a natural region of ancient Palæozoic rocks separated from the newer rocks of the east along a line drawn from Bridgwater Bay to Torquay. It may be viewed as a synclinal trough like those in the south of Ireland, running east and west with Old Red Sandstone strata on the north and south (which derived the alternative name of Devonian from thus occurring), and Lower Carboniferous rocks, not containing any coal, forming the lower ground between. The northern outcrop of the Devonian strata forms a barren upland sloping gently southward from Exmoor, where its highest point exceeds 1,600 feet, but falling steeply to the sea. The coast is picturesque with lofty cliffs and rocky shores dotted with frequented summer resorts at the mouths of short deeply cut valleys. The river Exe flows almost due south from its source, only four miles from the Bristol Channel, to its estuary on the English Channel. The Devonian strata on the south do not stand out so prominently; but they are pierced by several of the greatest outbursts of granite in England, which form prominent uplands. The largest is the plateau of Dartmoor, rising in many points to over 1,500 feet, and in Yes Tor to over 2,000. The surface is wilder and more barren than Exmoor, affording only a little pasture in summer. The granite weathers into clay which allows great marshes and

t bogs to form. In the centre of the moor in one of the most desolate ions of all England a great convict prison has been established. parated from Dartmoor by the valley of the Tamar, which runs south Plymouth Sound, dividing Cornwall from Devon, Bodmin Moor, ther granite boss, culminates in Brown Willy, 1,370 feet. A third mass granite gives character to the Land's End peninsula, its cliffs carved o fantastic forms by atmospheric erosion. Lizard Head is formed by a ilar mass of the rarer rock, serpentine. The contact of the granite with rocks which it pierces marks the richest part for veins of metallic ore, ecially copper and tin; the latter is still largely worked, though most the copper mines are closed. The decomposed granite itself forms na-clay, a valuable product which is not found on the granites of tland or northern England, whence all soft material was swept by the sheet. The rocky coast is highly picturesque on account of the ersity of its geological structure, and lters numerous fjord-like natural har- rs and bays. These are evidence that coast has been undergoing subsidence, ch is confirmed by the existence of sub- rged forests, records of land washed y, and the tradition of the sunken land Lyonesse between Cornwall and the ly Islands. *Penzance*, on Mounts Bay, ne headquarters of the pilchard fishery. *mouth* and *Dartmouth* were formerly portant harbours. *Plymouth*, standing the junction of the estuaries of the nar and Plym, really consists of "The ree Towns" — Plymouth, Devonport, Stonehouse. Plymouth Sound, pro-

FIG. 79.—*Plymouth Sound.*

ted by a breakwater, is one of the finest harbours in England, and it is of the headquarters of the British fleet. The arsenal is protected by an ensive series of modern fortifications. The south coast of the peninsula ing the mildest climate in Great Britain, has attracted many residents, and unds in picturesque health resorts. Of these *Torquay* is the largest and t known. The southern coast-lands are very fertile, and fruit-growing xtensively carried on, especially the growth of apples for cider-making. e low plateau of Lower Carboniferous rocks in the centre of the penin- a has rich grass-land and excels in cattle-raising.

The Scilly Islands consist of 140 islets and rocks lying about 30 es west of Lands End. The larger of the islands are inhabited, and vantage is taken of the exceptionally mild climate to raise flowers and ly vegetables for the London market. Here accordingly there is no icultural depression, and the few inhabitants are prosperous. Com- nication takes place by steamer with Penzance.

The Pennine Chain.—The Pennine Chain is a backbone to northern England, and its bold configuration determines the river systems of the whole country north of the Tees-Exe line. It is formed throughout of a great anticline or arch of Carboniferous rock, which was originally ridged up from east and west. Rivetted, if one may use a metaphor, to the Southern Uplands of Scotland by the great granitic mass of the Cheviot hills, and numerous long volcanic dykes which run east and west, the Pennine chain extends southward until the heights spread out into finger-like ridges which sink to the level of the English Central Plain, and the Carboniferous rocks dip under the Triassic formations. The Coal Measures, the highest member of the Carboniferous series, have been stripped off the top of the ridge by denudation, leaving the Carboniferous limestones and Millstone Grit exposed; but they appear here and there along its flanks. On the eastern side the great coal-field of Northumberland and Durham occurs in the north, and that of the West Riding of Yorkshire in the south. These are separated from the newer rocks by a belt of Magnesian Limestone running due south from the mouth of the Tyne almost to the Trent, and forming a picturesque escarpment towards the west. On the west side the fault which separates the Pennine Chain from the rocks of the Lake District destroys the symmetry in the north, though the Cumberland coal-field in a way corresponds with that of Northumberland; but in the south the coal-field of Lancashire corresponds closely to that of Yorkshire. The Carboniferous limestone exposed in the northern and in the southern parts of the ridge weathers into very picturesque heights and valleys, and subterranean erosion has formed in it many caverns and underground stream-courses. The highest summits are in the Crossfell group (2,900 feet), overlooking the Eden valley in a grand escarpment, the bold form of which is intensified by an intrusive sheet of basalt; and the somewhat lower but more picturesque uplands of the Peak district (highest summit, 2,800 feet). The middle portion of the chain, formed of Millstone Grit, also weathers into fine peaks of a different type, and grass-covered uplands. It is crossed by a depression between the valleys of the Wharfe and Ribble, the highest point of which only reaches 500 feet. Beyond the limits of the Pennine Chain the Coal Measures, which had dipped below the Triassic rocks, come up like islands as the coal-fields of Staffordshire and Leicestershire, while the coal may be reached in many places by deep mines carried down through the younger overlying rocks. Most of the great manufacturing towns of England are situated on the Triassic plain bordering the Carboniferous uplands. The rivers flowing from the Pennine chain form long valleys, or dales, furrowing the uplands and affording sites for the towns. Their estuaries are important harbours, especially the Ribble and Mersey on the west, and on the east the Tyne, Tees, and the many streams converging from east and south to enter the Humber. Yorkshire, Lancashire and Northumberland, the three chief counties of the Pennine Chain, are known for the sturdy independence

t perseverance, and industrial capacity of their people. Small towns
icturesque situations and in the neighbourhood of mineral springs
e risen into fame as watering places and health resorts; such are
rogate, Buxton, and *Matlock.*

The high moorlands are adapted for sheep pastures, and it is natural
the villages and market towns in the sheltered dales should, from an
y period, have been engaged in the wool trade and the weaving of
llen goods. The fertile plains surrounding the uplands as naturally
ame valuable for agriculture and stock-raising. The minerals were
ked from early times, but it was not until the era of machinery was intro-
ed by the inventive genius of the people of the district, that the stores
ron and coal localised the greatest seat of textile manufactures in the
ld. The lines of communication from north to south were necessarily
ied along the bordering plains. That on the east ran through the Vale
York and then along the coastal plain, where *Berwick,* with its long
lge over the Tweed, was an important stopping place, and until the
of the fifteenth century was frequently taken and retaken by Scottish
English armies. The North-Eastern Railway now follows this route.
the west the road followed the coastal plain, but turned northward up
Lune valley to *Carlisle,* always an important border town. This is now
route of the London and North-Western Railway, but the Midland
lway runs along the watershed of the Pennines, and descends by the
n valley to Carlisle, the importance of that junction being further
anced by the cross-country line from Newcastle through the Tyne
ey, and the three main lines from Scotland.

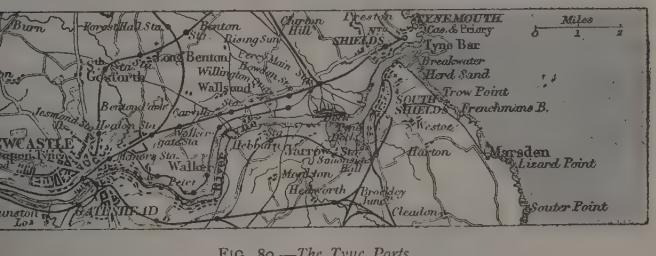


FIG. 80.—*The Tyne Ports.*

The Northumberland and Durham Coal-field.—The counties
Northumberland and Durham are separated by the river Tyne, which
s across the middle of the coal basin to the sea. *Newcastle* takes its
ne from a castle erected immediately after the Norman conquest close
he site of the ancient Roman bridge which gave origin to the town.
shipping of coal from Newcastle (called "sea-coal" in the old days)
gone on from the thirteenth century, and it is still the greatest coal-

shipping port for coasting trade. The Tyne for ten miles, from Newcast to the sea, has been deepened to admit large vessels, and the harbours *North* and *South Shields* at its mouth are included with the docks whic line the river as the *Tyne Ports* for custom-house purposes. *Gateshead*, o the south side of the river, shares the industries of Newcastle, which a chiefly the manufacture of iron, machinery, and chemicals. The gre Elswick Works, where the largest warships are built, rank with the wor at Essen in Germany and Le Creusot in France. One characteristic the manufacturing region surrounding Newcastle, as of that in Sou Wales, is the absence of factories employing women. This gives rise quite different social conditions from those prevailing on the other coa fields where factory work predominates. *Sunderland*, at the mouth of th Wear, almost rivals the Clyde in shipbuilding, and like the *Hartlepoo* just north of the Tees, it has a considerable coal export. The picturesqu cathedral city of *Durham* contains a university, the science college which is in Newcastle.

The West Riding Coal-field.—The ancient woollen industries the Pennine villages have developed by the aid of mechanical power an perfected communications until the valleys of the Aire and Don, with the tributaries, are now amongst the most densely peopled of manufacturin districts, although the uplands between them are still desolate moor Half a dozen railway lines connect this coal-field across the central ridg with the Lancashire coal-field on the west, and communication with th south and east is still more complete. Most of the raw wool is no imported through Liverpool, and the export of finished goods takes pla both through that port and through Hull. *Leeds*, the largest town of th district, stands near the point where Airedale opens on the Vale of Yor and while it has become one of the chief cloth manufacturing towns an the leading cloth market in Europe, it does not rely on one staple. Iro smelted in the town, supplies great engineering works at which heav machinery of all kinds is turned out. *Bradford*, about eight miles furth west, specialises in the manufacture of worsted yarn and cloths wove from it. *Halifax* and *Huddersfield*, on the extreme west of the coal-fiel and many other large towns in the neighbourhood, each manufactures som special class of woollen goods. *Sheffield* depends not on woollen but o steel manufactures. It is beautifully situated in a picturesque amph theatre of hills at the junction of several streams with the Don. It ha been famous for its cutlery for many centuries, and has always importe Swedish iron for use in this manufacture which is said to have bee promoted by the existence of good grindstone quarries in the neighbour hood. All branches of steel manufacture are now concentrated her including steel rails, armour plates for battleships, and machinery.

Outside Yorkshire, *Nottingham*, where the south-east of the coal-fiel practically touches the Trent, is a great textile manufacturing tow the staple of its trade being cotton hosiery and lace. *Derby*, in a simila

ion where the south-western corner of the coal-field nearly touches Derwent, a tributary of the Trent, has somewhat similar manufactures, has in addition the works of the Midland Railway Company whose line traverses the coal-field.

The East Yorkshire Plain and the Humber.—The escarpment Magnesian Limestone which marks the eastern boundary of the Coal sures is separated by a narrow arm of the Central Plain from the Oolitic rpment. This plain, underlain by Triassic or New Red sandstones, ches northward through Nottinghamshire from the point where the t begins to turn northward, to the estuary of the Tees. In some parts of l can be reached by deep mines, but the surface being covered by rich its value is mainly agricultural. The richness of the land and quiet ty of the country, varied by the remains of Sherwood and other ent forests, have led to the building of many fine country mansions, one part bears the familiar name of the "Dukeries," on account of the ber of ducal seats. It is, as a whole, a low and level plain, dipping ly from both sides to the Humber, the Trent running northward along astern margin, and the Ouse with its tributaries running southward. Vale of York, famous for its farms and for its horse breeding, is red with alluvial and glacial deposits. In the middle *York* is situated, ancient walls still encircling the town, and its magnificent Minster being ned as the finest church in the British Islands. The central position, way between London and Edinburgh, which made it, as *Eboracum*, capital of Roman Britain, now secures it importance as a railway tion. *Hull*, although situated in the Chalk Belt, owes its importance ely to being the deep-water harbour on the North Sea nearest to the fields of the West Riding and Lancashire, with which it is in close ay connection. It is the natural complement of Liverpool, serving he export of manufactures to the Baltic and Continental ports. Its rade in fish still continues although surpassed by other interests.

The Lancashire Coal-field.—The Lancashire manufacturing region, ding the portions lying in the neighbouring county of Cheshire, a population as large as that of Scotland, and there is probably no part of the world of equal extent so densely peopled. The coal-field yields enough for local consumption in the innumerable factories and neering and chemical works, and there is no export of coal. Although owns are marked on ordinary maps as separate and distinct, this only s to the different municipalities. The area covered by buildings is st continuous for a radius of eight miles round the centre of Manter on the low western plain, and large towns are clustered close de, while strings of industrial villages run up the narrow dales of the ine Chain to the east between the moorland pastures. The woollen stry was originally as common in this district as on the Yorkshire ; but the imported cotton has long since taken the first place, the t climate favouring its manufacture. The twin centres are Liverpool

and Birkenhead, the gate for exports and imports, and Manchester a Salford the depôts for distributing the raw material to surroundi manufacturing towns, and collecting the finished goods. The opening the Manchester Ship Canal which allows ocean steamers to come dire to the inland centre has not yet materially affected this relation. *Liverpo* runs for six miles along the right or eastern bank of the Mersey estua and for this distance there is a continuous row of docks, outside whi a floating landing-stage allows the largest steamers to come alongside f embarking and landing passengers. The tides of the estuary are ve rapid, but a serious bar which used to prevent large vessels entering low water has been completely cut through by dredging, and the port always accessible. As well as a great exchange and other business edifice Liverpool possesses fine public buildings and museums, and one of t colleges of the Victoria University. *Birkenhead* on the left bank of t

FIG. 81.—*Liverpool and Birkenhead.*

estuary is approach by ferry steamers a by a tunnel under t Mersey. Apart fro its docks it is a re dential suburb Liverpool. Althou there are extensi engineering work some shipbuildin and a large numb of manufactures every kind, the re importance of Live pool lies in its harbo and the associat railway system. The lower course of the Mersey between Manches and Liverpool is over a low, flat and marshy plain, which was original almost impassable on account of bogs, and the construction of t first railway between the two towns (30 miles) across the Chat Mo in 1829, was considered one of the greatest engineering feats of t time. This bog and many others have since been drained and convert into solid ground. *Manchester* forms practically one town with *Salfor* though separated from it by the narrow stream of the Irwell, whi like most rivers of the district is as black as ink from dye refuse. T centre consists mainly of vast warehouses, for Manchester itself is merca tile rather than manufacturing; the Royal Exchange is said to be t largest building of its kind in existence, and the Town Hall is also a supe structure. Owen's College is the chief college of Victoria University. T factories are in the suburbs and in the ring of neighbouring towns. Ashto Oldham, Rochdale, Bury, and Bolton (or Bolton-le-Moors) lie close up

teep rise of the Pennine moorlands along the third part of a circle east to north-west of Manchester, and all are within ten miles of its e. *Oldham* is by far the most important for manufactures; in fact it ins one-third of all the cotton spindles in England. *Bolton* specialises e finest qualities of cotton yarn, and *Bury* and *Rochdale* retain a con- able woollen manufacture, although cotton-spinning predominates. e to the northern edge of the coal-field *Preston* stands at the head of navigation on the Ribble, where the main line of the London and h-Western Railway crosses the river. Here Arkwright set up the first ning frames worked by mechanical power in 1768, and the cotton

FIG. 82.—*The Manchester District.*

stry is still of great importance. At *Blackburn*, in a valley nine miles e east, Hargreaves had established his "spinning jenny" in 1767, and still one of the chief seats of cotton-weaving. The canal from Liver- to Leeds and a railway pass eastward through Blackburn and up the y which leads across the Pennine ridge to Airedale, through *Accring-* nd *Burnley*. All these towns depend on cotton. The number of ries on this coal-field creates an enormous demand for machinery, he towns consequently contain large engineering works. There are sive chemical, glass and soap works at *St. Helens*, and other towns unding Liverpool. The great industrial population of the region

requires the creation of a number of health and pleasure resorts on th breezy uplands of the Pennine Chain, and along the fine sand-beaches the coast where *Southport* and *Blackpool* are the largest of a host watering places.

The Central Plain.—The Central Plain of England may be looke on as extending from the Mersey and Dee estuaries, and the souther slope of the Pennine Chain on the north to the Welsh hills on the west, an the line of the Oolitic escarpment on the south and east. It correspond to the region of the Triassic red rocks and of the Lias; only where th strata have been raised into gentle north and south folds in the wes patches of the Coal Measures have been exposed by denudation. Here th surface is comparatively high and undulated, but it forms one low pla traversed by the Weaver on the north-west, and another followed by th Avon to the south-west, while on the east the rivers flowing from th Pennine dales and the short streams from the Oolitic escarpment converg on the Trent, the course of which is guided northward by the low escarp ment of one of the hard beds of the Lias. This plain comprises the great part of the counties of Cheshire, Staffordshire, Worcester, Warwickshir Leicestershire, and Nottingham. It is very rich agriculturally, and wa formerly covered by extensive woods; the names of the Forest of Arde and Charnwood Forest being still applied to large districts. No pasturage is of the greatest importance, the cattle of the west and th horses and sheep of the east being famous. It is full of scenes of historic interest; castles round which hang romantic traditions of all ages English history, battlefields where the destinies of the nation have bee decided, and crossing points of natural routes which were guarded b Roman camps in ancient days, and are served by railway junctions lik Crewe, Stafford, Rugby, and Leicester, in our own time. It is the cent of England, and the scenery around *Stratford-on-Avon*, which inspire Shakespeare, may be taken as typical of all that is most characteristic rural England. Across this plain there is a network of canals whic practically places all the navigable rivers of the country in communicatio with one another.

The Cheshire Plain and Potteries.—The Cheshire Plain is one the richest grazing districts, and celebrated especially for its chees *Chester* is remarkable for the perfection with which its Roman wa surrounding the town has been preserved, and for the quaint mediæv streets with arcaded pavements. It was a seaport in Roman times, but th head of the estuary of the Dee has now been silted up and it is cut off fro the sea. The Trias rocks contain great beds of rock salt which are worke in the Weaver valley, especially at *Northwich*; but it is cheaper to get the sa by pumping brine from the mines, water being allowed to enter in ord to dissolve it. As a result of this method of working, subsidences of th ground are continually taking place, and sunk, cracked, or twisted hous are common in the towns. Where the Coal Measures rise to the surfa

orth Staffordshire, there is a dense population in the upper valley of Trent grouped in numerous small towns around *Burslem* and *Hanley*. district is known collectively as "The Potteries," on account of the t industry in earthenware and china promoted by the quality of the found in the neighbourhood.

The Black Country.—From very early times the great forest of en had supplied charcoal for smelting iron ore, and various iron and l industries had developed in Birmingham, Wolverhampton, and many r small towns in the neighbourhood. Family workshops were the , and even the women and children were brought up to blacksmith's

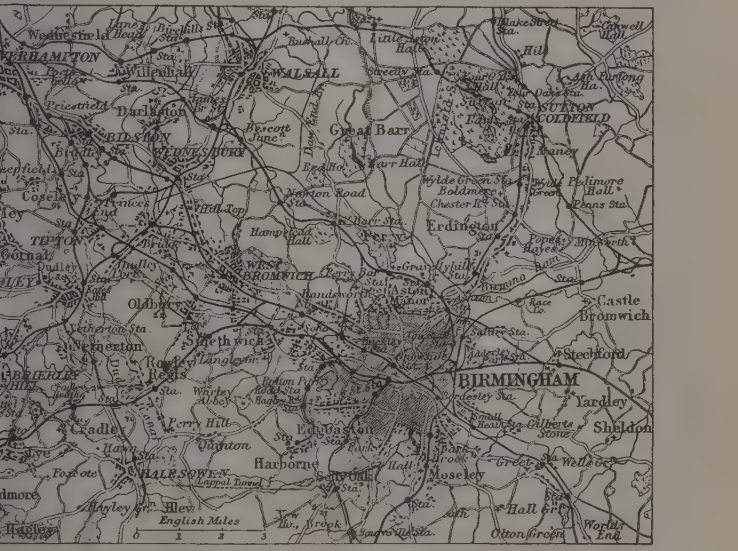


FIG. 83.—*Birmingham and the Black Country.*

, making nails chains, and other small articles. When the discovery made that coal could be used in working iron, and the iron trade rted the southern counties, it remained unchanged in the Black ntry on account of the coal-fields of South Staffordshire. *Birmingham* grown into a great city and a very important railway centre, but, ough the modern methods of large establishments have been intro- d, many small family workshops still remain turning out articles of a ial kind. Jewellery of all sorts, watches, coins for foreign govern- ts, buttons, beads, and small metal work of every description, are its acteristic trades. The making of firearms is also very important, from

flint-locks for African trade to magazine rifles. Bedsteads employ man hands; bicycle-making and the construction of steam-engines are largel carried on. Birmingham is a progressive and enterprising town: it municipality has taken a lead in introducing modern improvements, fro steam-engines and gas-lighting in the early days of the great firm o Boulton and Watt, to electric traction at the present time. The publi buildings are very fine, the pictures in the Corporation Galleries ar exceptionally good, and the new University with its modern Faculty o Commerce educates one of the most alert and intelligent populations in th country. The smaller towns of the Black Country are as cheerless as th name of the district implies. Trade is much specialised. *Wolverhampton* ha numerous blast furnaces, and manufactures all kinds of heavy iron goods other towns produce needles or nails, spurs or horses' bits, fish-hooks, ligh chains, chain-cables for shipping, and even steel anchors. The conditio of the women and children engaged in nail and chain-making in the cottages was formerly deplorable, and in some quarters is still a reproac

Other Towns of the Plain.—*Burton-on-Trent* is the greatest brewin town in the country, the water of the district being specially suitable fo brewing on account of containing sulphate of lime. The supply of barle for malting and of hops demands good railway facilities, and the streets o Burton are much cut up by railway sidings running to the brewerie Large cooperages have also been established to turn out the innumerabl casks required. *Coventry*, a very ancient town, has acquired moder importance on account of its great manufacture of cycles. *Leicester*, i the flat valley of the Soar, a southern tributary of the Trent, was one o the old woollen manufacturing towns, the pastures of the neighbourhoo yielding a fine wool particularly adapted for woollen hosiery, which i still the staple manufacture. Boot and shoe making is also importan A curious outcrop of Archæan and other ancient rocks occurs to th north-west of Leicester, giving rise to the picturesque hills of Charnwoo Forest, in some of which granite is quarried.

The Jurassic Belt.—From the eastern end of the Cornwall-Devo peninsula, and skirting the Central Plain of Triassic rocks, a series o bands of Secondary and Tertiary rocks sweeps in a northern curve, eac formation dipping below the next, and forming by the weathered edge of the harder strata facing the north or west more or less continuou escarpments or lines of heights. The contrast of the gentle dip-slopes an steep escarpments is explained by Fig. 30. The determining influence whic the edges of the gently-tilted strata exercise on the course of the drainage o the country is best exemplified by the Exe-Tees line of watershed by whic the South-Eastern district is bounded. The Avon-Severn flows south westward, and the Soar-Trent north-eastward, parallel and close to th first escarpments of the Secondary rocks, so that no tributaries exceedin a few miles in length reach them from the south or east. Even beyon the break of the Humber estuary to the north, the course of the Yorkshir

e is parallel to the escarpments. A similar parallelism may be traced any other rivers, the courses of which appear inexplicable on any map showing geological features. The escarpments are formed usually of e one hard bed of sandstone or limestone, the softer beds of clay or weathering away to level or undulating plains. The bold front of Oolitic escarpment can be traced in a sweeping curve from Portland ad on the south, overlooking the remarkable line of Chesil Beach, ugh the Cotswold Hills, where the highest point is 1,100 feet, and low ridges towards the north-east, until it reaches the North Sea in high mass of the North Yorkshire Moors south of the Tees, where ations of nearly 1,500 feet occur. The land slopes gently from the tic escarpment in broad plains of clay to the edge of the Chalk or aceous escarpment. Though narrow on the south coast, the Jurassic widens towards the north, including the greater part of the counties Gloucester, Oxford, Buckingham, Bedford, Northampton, Huntingdon, and, Lincoln, and the North Riding of Yorkshire. Besides building e, quarried largely at *Portland*, where a great prison supplies convict ur, in the neighbourhood of Bath, where the Box tunnel pierces the rpment, and elsewhere, the chief mineral products of this formation are s for brickmaking, fossil deposits used as fertilising agents, and the ndant iron ore of the Cleveland Hills, which form the escarpment of Yorkshire moors. The ore brought down from these hills to the Tees nelted at *Middlesbrough* by coal brought from the Durham field. The o coast formed by the moors is cut into narrow river-mouths, in one of ch the little town of *Whitby* has grown up, and the fashionable watering-e of *Scarborough* also stands upon this coast. The steep slopes of the wolds near the other end of the line shelter a row of towns on the plain below them, of which *Gloucester* and *Cheltenham* are the chief. deep valleys which trench the southern end of the escarpment contain ll towns which have been engaged in the manufacture of "West of land cloth" for centuries. This was orginally a consequence of the woolled sheep pastured on the hills; but it has not undergone a ern development, as in the Pennine district, and *Bradford-on-Avon*, *ne*, and *Stroud* are still of only local importance. *Bath*, although aining some flourishing manufactures, owes its importance to the hot eral springs which made it famous amongst the Romans as a health rt. The middle portion of the Jurassic Belt is lower than the pastoral wolds and the Yorkshire Moors, with less pronounced escarpments, the broad fields of Oxford and Kimmeridge Clay make excellent cultural land, growing heavy crops of wheat. The river Thames, g on the Cotswold plateau, flows eastward until it meets the Cherwell ing from the north. At the junction *Oxford* stands on an alluvial dow. It is the most venerable seat of learning in England, with a versity dating from the twelfth century, and now composed of twenty-colleges, most of them picturesque buildings with beautifully kept

gardens. Museums, laboratories, and observatories supply means of scien tific instruction, but Oxford continues to be famous rather for classica learning than for scientific research. *Bedford* is a type of the marke towns, with small manufactures of agricultural implements, which ar common in the district. *Northampton*, on the river Nen, was always great leather-making town, and is now the chief seat of the boot and sho trade in the United Kingdom. The Nen flows north-eastwards, parallel t the strike of the strata, and *Peterborough*, a cathedral city and an importan railway centre, stands on it at the very edge of the Fenland. Further north *Lincoln* occupies a remarkable site in a gap where the Witham trenches one of the minor escarpments. The name implies that it was Roman colony, and it was always a crossing place of roads as it is now o railways. In the whole Jurassic Belt there is not one town with a popu lation approaching 100,000 inhabitants; this is a consequence of th absence of mineral fuel to promote manufactures.

The Chalk Country.—The Chalk is the characteristic feature of th south and east of England, covering the whole of the older rocks ove almost the entire area. It sweeps as a vast sheet from the sea at the mout of the Axe in the south, to the sea at Flamborough Head in the north; an its edge, facing the older Cretaceous rocks (Greensands) that dip under as the Jurassic rocks dip under them, forms the succession of gentle height roughly concentric with the Oolitic escarpment, which in different part bears the names of the Dorset Downs, the Marlborough Downs, th Chiltern Hills, the East Anglian Heights, the Lincolnshire Wolds, an the Yorkshire Wolds in the East Riding, terminating in the great chal cliffs of Flamborough Head. This escarpment also shows a certai controlling influence on drainage lines, but the rivers flowing parall to it on the plain on the north in almost every case turn abruptly and flo southward through gaps in the ridge. The soluble rock of which it composed has been rapidly eroded and cut through by the streams flowin down the dip slopes, which in time "captured" and diverted the river of the plain beyond. Everywhere the scenery of the Chalk uplands is th same, rolling country with dry valleys and grassy, treeless hills, the whit chalk gleaming through every scratch on the overlying turf. On the ea coast this formation, and the Jurassic Belt within it, is breached by tw notable inlets. The southern is the wide and very shallow depressio known as the Wash, which is bordered landward by the level plain of th Fenland. The northern inlet is the narrower and deeper estuary of th Humber. A portion of Dorsetshire, the greater part of Wiltshire, considerable share of Hampshire and Oxfordshire, most of Hertfordshir and Cambridgeshire, the west of Norfolk and Suffolk, the east of Lincol and the East Riding of Yorkshire all lie on the Chalk. The souther portion is mainly pastoral, the thin soil covering the Chalk serving onl for the growth of pasture grass, but farther north the ancient ice-shee spread a covering of boulder clay which makes a fertile soil peculiarl favourable to wheat-raising in Cambridge and Lincoln.

Towns of the Chalk Country.—As in the Jurassic Belt, the
ns, though numerous and of much historic interest, are small; they
as a rule taken little part in modern development, and the rural
ket town is the predominant type. Salisbury Plain is the centre
nce the Chalk hills of the northern and the southern branches diverge.
ndulating pasture-grounds bear the great stone-circle of Stonehenge,
argest prehistoric monument in the British Islands, and on the southern
gin of the slope, at the junction of several river valleys with the south-
ing Avon, stands *Salisbury* with its magnificent cathedral. The valleys
ne other south-flowing rivers of the Chalk plateau contain towns of
l antiquity and historic interest situated in very similar positions; of
e *Winchester*, associated with the memory of Alfred the Great, is the
t important. On the northern edge of the Chalk, where the Kennet
s eastward to the Thames below Marlborough Downs, *Marlborough* is
ated. The Vale of Aylesbury, north of the Chilterns, is dotted with a
n of small market towns. On the west and south the Thames closely
lers these hills, and *Reading* stands at the confluence of the Kennet,
he margin of the fertile London clay, a busy town with the semi-agri-
ural industries of biscuit-making and seed-raising. *Cambridge*, on the
e of the Chalk where the low plain of the Fenland begins (it is only
eet above sea-level), is the second great university town of England
seventeen colleges. It has for many centuries been the chief centre
nathematical learning. In the east of Lincolnshire the largest town is
nsby, at the mouth of the Humber. It has a large general trade, and
istinguished by being the chief market for sea fish in the United
gdom, London excepted. North of the Humber the Chalk wolds of
East Riding are separated from the Oolitic moors of the North Riding
he valley of the Derwent. In this region the boulder-clay deposit is
thick, the whole Holderness coast from the high chalk cliff of
nborough Head to the low shingle spit of Spurn Head being formed of
, which is being rapidly eroded by the sea.

The Fenland.—An extensive but shallow depression of the Chalk and
ord Clay gave rise to a great square inlet of the sea between Lincoln
Norfolk, fringed by broad marshes. This district is the Fenland.
rts have been made for centuries to reclaim and drain the marshes;
r primitive character is now quite lost, and they form wide flat plains
rable land crossed by innumerable canals, and in many places embanked
rotect them from floods, as some portions lie at, or even a little below,
level of the sea. *Boston*, with its great parish church, the famous tower
which (Boston stump) was long an important landmark to sailors, and
gs *Lynn* stand on the seaward margin at opposite angles of the shallow
sh. Both were formerly active seaports, but the silting of the channels
the increasing size of vessels have left them out of account. Here and
e over the Fens flat mounds of gravelly formation rise above the level
and clay. These were islands and secure refuges in the ancient days.

Each now bears a little town, of which the cathedral city of *Ely* is the most important. The Fenland contains a remarkable number of fine churches and abbeys.

The Weald.—Above the Chalk, and leaving only a narrow strip of it exposed parallel to the belt of Jurassic rocks, a series of Tertiary clays, sands, and gravels, appears once to have extended across the whole south-eastern corner of England. This was the last portion of the British Islands to be elevated above the sea. During the final uplift the whole south of England appears to have been subjected to stresses from south to north, causing the ridging up of a broad anticline running from east to west. Salisbury Plain forms the western extremity of this elevation of the Secondary strata; and the Tertiary rocks were almost entirely stripped by denudation from the ridge which separates the remaining Tertiary formations into two basins, named after London and Hampshire. The ridge has been so deeply eroded that all the chalk has been stripped from the top of the arch east of a line from Farnham to Petersfield, exposing the Gault clay, Greensand, and Weald clay, on which it lay, and the still deeper Lower Cretaceous sandstones, which formed the core of the ridge. The cut edges of the Chalk and of the Greensand form steep escarpments surrounding and facing the great oval exposure of earlier rocks, across the east end of which the Strait of Dover has been cut, leaving part of the Wealden region on the mainland of Europe in the north-west of France. The northern line of the Chalk escarpment of the Weald, with its steep slope facing south, forms the North Downs, beginning in the Hog's Back, and terminating in the white cliffs of the North and South Forelands. The rivers flowing northwards from the ancient Wealden dome, cut through the line of the North Downs in a series of deep gaps, most of which are now the sites of towns, and afford passage to roads and railways. From west to east these rivers are the Wey, on which *Guildford* stands (Fig. 16), the Mole with *Dorking*, the Dart with *Sevenoaks*, the Medway with *Maidstone*, and the Stour with *Ashford* and the venerable cathedral city *Canterbury*. All these rivers receive tributaries which flow parallel to the strike of the rocks along the clay plains between the escarpments. The escarpment of the South Downs similarly faces northward, and runs along the south coast to terminate in the grand cliffs of Beachy Head. The rivers flowing southward from the Wealden dome have cut it into lengths by several gaps, some no longer occupied by streams, including that at the mouth of which *Chichester* lies, and those of the Arun with *Arundel*, the Adur, the Ouse with *Lewes* and *Newhaven*, and the Cuckmere. Their tributaries similarly run from east or west along the clay plains between the escarpments (see Fig. 36 for explanation). The Chalk Downs, dry on

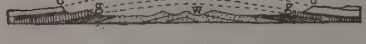


FIG. 84.—*Section across the Weald from North to South.* cc *Chalk*, gg *Greensand escarpments*, w *Wealden sandstones*

surface but saturated with water at the heart, are in sharp con- to the flat wet strips of clay land at their base, to the Green- escarpments within them, and to the arid heights of the Wealden stones in the centre, in which the small number of streams and ngs makes the water supply a question of much anxiety. A great of the sea-coast of the Weald is a low coastal plain, which tidal on and the slow elevation of the land has recently built, robbing old seaports *Rye*, *Winchelsea*, and *Pevensey* of their access to the water, building the shingly projection of Dungeness, enclosing the swamps Romney Marsh, which was formerly a lagoon, like that behind Chesil ch. The ancient forests of the Weald formerly made Surrey, Kent, and ex important iron-smelting counties, but their furnaces have all been nguished for a century, and most of the woods have disappeared. The f resources now are pasturage on the downs, yielding the famous h Down mutton, and agriculture on the clays and sandstones of the ld, especially the great hop-crops of Kent, for the picking of which poorest class of Londoners swarms to the fields every autumn. *r* flourishes because it commands the shortest passage to the continent he Calais route, but deep borings in the neighbourhood have reached beneath the Cretaceous rocks, and mines may become important. *hton* is simply a fashionable seaside suburb of London, fifty miles nt from the metropolis, but reached in one hour by rail, and *Eastbourne*, *ings*, and *St. Leonards* are similar resorts on a smaller scale. To the n *Margate* and *Ramsgate*, on the Isle of Thanet, no longer an island, popular with the humbler London "trippers," and *Tunbridge Wells* in centre of the Weald, like *Haslemere* farther west, is a favourite town esidence.

The Hampshire Basin.—The Tertiary rocks form a fertile undulat- plain. In the south-west the New Forest is still an extensive wood- the remains of that planted as a hunting-ground by William the queror. The coast is usually low, and is broken by the branching ries of Poole and Portsmouth, and the wider channels of Spithead he Solent, which cut off the Isle of Wight and run up into Southampton er. All parts of the coast formed by Tertiary deposits are undergoing l erosion, and the sea is gaining upon the land. The Chalk border on outh is seen at Ballard Point, is carried across the centre of the Isle Vight and appears again beyond Bognor. *Portsmouth* is the most gly fortified town in the United Kingdom, on account of the rtance of its splendid harbour as the head-quarters of the navy, and ite of the chief naval dockyard. *Southampton*, a purely commercial with good docks, is increasing in importance for passenger traffic South Africa and America on account of its proximity to London. th and pleasure resorts line the coast, the most frequented being *nemouth*, laid out on the top of the crumbling clay cliffs to the west, he little seaside towns of the Isle of Wight.

The London Basin.—The London Basin, made up of various and gravels, occupies a depression in the Chalk, which is reached e where by the borings for artesian wells. It extends from the ea border of Wiltshire, along the valley of the Kennet, and gradually wi until it meets the sea from Herne Bay to Cromer. The coast of section is typically low and fretted into shallow estuaries, among w that of the Thames is supreme, although the Blackwater and the inle Harwich are equally characteristic. In the east of Norfolk the low land on the lower courses of the Yare, Bure, and Waveney, conta number of shallow lagoons known as the Broads, surrounded by mar Foulness, the Naze, and Orfordness are typical capes of low ground. gravel hills are often conspicuous features in the generally flat land fo by the clays, as in the line of heights which runs from Harrow east through the northern suburbs of London. The soil is remarkably f and naturally richly wooded, Epping Forest being a fine example. manner in which the London Basin is surrounded by its wall of C cannot fail to strike the railway traveller from London by any line ex the Great Eastern, on account of the deep chalk cuttings which are pa through. The one great river is the Thames, which cutting through Chalk escarpment west of the Chiltern Hills, flows out along the south of the London Basin, receiving the Lea from the Chalk belt on the n and many small rivers from the Weald on the south.

The Small Towns of the London Basin.—The towns of Thames valley are, with the exception of London and its suburbs, s and mainly important as centres for residential neighbourhoods. *Win* is the usual royal residence of the British court, and the small tow *Eton* on the opposite bank of the Thames, is important for its an public school. In the north-east, where the deposits of the London E are covered by the thick boulder clays of East Anglia, there was, be the fall in the value of wheat, the best farming land in England, and counties of Essex, Suffolk, and Norfolk are still pre-eminent agricultur The large town of *Norwich* is just beyond the London Basin. It wa ancient cloth-making town, and one of the first to profit by the migration of Flemish weavers; it still retains a share of this manu ture, although boot and shoe making, the construction of agricul machinery, and great starch and mustard works are now more impor commercially. On the coast *Yarmouth* continues to be a fishing cen *Ipswich* retains a share of manufactures; *Colchester* depends largely on great oyster beds of the Colne estuary, and *Harwich* has developed by construction of an artificial harbour for continental passenger traffic distance across the North Sea being just sufficient to give the passen by night-boats time to sleep comfortably. Along the shingly coast t are many little watering-places, celebrated for the freshness of air.

London.—The name *London* is variously applied. The *City of Lon*

portion under the jurisdiction of the Lord Mayor, is a small area
reen the Tower and the site of Temple Bar, with a resident population
nly about 30,000, although ten times that number are employed within
imits during the day. The *County of London,* administered by the
don County Council, has an area of 120 square miles, or one-thousandth
of the United Kingdom, and a population, in 1901, of 4½ millions, or
e than one-tenth of the population of the country. But the area under
charge of the Metropolitan and City Police forces, called *Greater*
don, includes a radius of about 14 miles from Charing Cross—an area
)0 square miles—the whole of which may be viewed as a suburban, if
an urban district, and this included 6½ million people in 1901. The
of London comprises the whole estuary of the Thames, extending
go miles from London Bridge to the Nore (see Fig. 85). No such town
s in any other part of the world. The population exceeds that of
land or Ireland, and is even greater than that of fifteen of the independent
ntries of Europe, while the trade of the port is greater than that of any
plete country except the United States, Germany, and France. The
re of its growth and the successive swallowing up of innumerable
ns and villages deprives it of
definite plan, but although of
e architectural distinction, and
many narrow and irregular
ets, the essential feature of a
plete drainage system has
a so carefully attended to, that
don has the smallest death-
of any large town, and is
cely below the average of the whole country in healthfulness. The

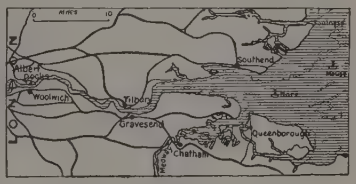


FIG. 85.—*Thames Estuary.*

ral features of the site of central London have been obscured by nearly
nty centuries of human interference; but the results of the original
graphy are still to be discerned in the arrangement and in the names
he streets. Before Roman times there was a fortified British camp
ed *Linn-dun* (the hill over the lagoons)—on a low hill which rose
ptly from the Thames, constricting the tidal lagoons which then
ned its estuary to a width that admitted of a ferry, and latterly of a
ge (London Bridge) being established. This hill was strengthened for
nce by the steep ravine of the Fleet river (now Farringdon Street) on
west, and the Lea marshes on the east. The Romans had one of the
es or fords to connect their trunk roads at this point, the other crossing
g at Westminster, two miles farther up the river. From Westminster
, Watling Street (the present Edgware Road) ran straight to Chester,
when the first London Bridge was built in 1170 the ford was abandoned,
the road diverted at what is now Marble Arch, to lead eastward to the
ge. The Tower of London is the lineal successor of the old hill fort, and
Paul's Cathedral marks the centre of ancient London and of the modern

"City" (Fig. 15). Between them now stands the Royal Exchange and the Bank of England—the business and financial centres of the world. Westminster was originally grouped round the ancient abbey, which is now the last resting-place of the most illustrious of the British people. Here Westminster Hall was part of the palace of the early kings, and still stands in association with the Houses of Parliament that have been several times rebuilt on the same site. The road between the commercial city of London and the political capital of Westminster lay along the low strand of the broad tidal Thames, hence its name; but now it is separated from the river by the broad Embankment which confines the tidal waters to a narrow channel. The port was necessarily below London Bridge, and up to that point the river was kept available for shipping by embanking it, and

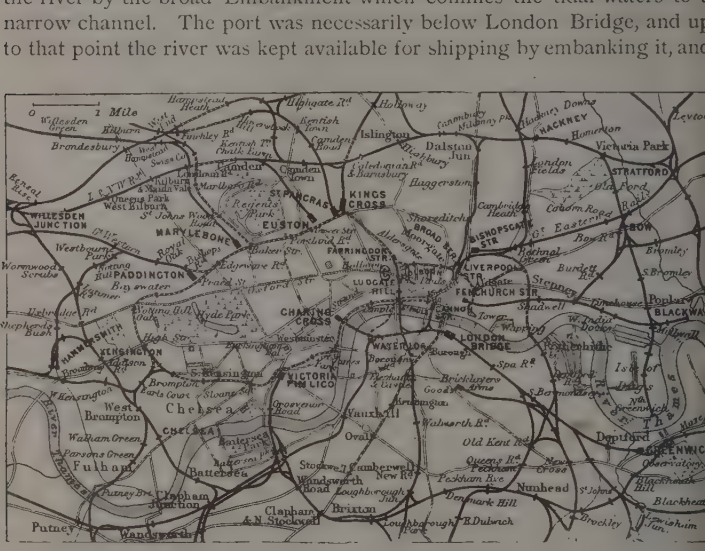


FIG. 86.—*London.*

excavating docks in the flat ground projecting between the windings. As vessels became larger the docks were increased in size also, and constructed further down the estuary, until now the activity of the Port of London extends to Tilbury, 20 miles from the Tower. The east of London has grown by commerce and has attracted many branches of manufacture, the enumeration of which would be impossible. In no other country is there so vast an extent of small streets inhabited exclusively by people of the working classes, drawn from all nationalities, as in the East End of London, a term including the separate municipality of *West Ham*. On a hill on the south side of the river stands Greenwich Observatory, which sets the time for the world and whose meridian is the zero of longitude. Farther down *Woolwich* contains an arsenal and dockyard. For more than two hundred

ars London has been growing steadily westward from the City, the tide business always pushing the mansions of the wealthy farther and rther to the west. Recently the heights to the north and to the south of e Thames beyond the ring of public parks have been covered by suburban llas, inhabited by the business men of the city, and the expanding fringe London is always driving the country farther away. The terminal ations of the great railway companies are not arranged on any method lowing of easy inter-communication; but for passenger traffic the system underground railways has been greatly developed. In the main oroughfares the traffic too great to allow amlines to be laid, id alone amongst great ties London depends r street communica- ons on omnibuses.

London as a Centre.—Although London is tuated in one corner of reat Britain, the exi- encies of its absorbing affic have created a agnificent system of st express trains on the orthern and western ilways, which bring most all parts of the ountry within a twelve ours' journey of the apital. The supplies for ie food of London and r distribution to the sur- ounding country come by train and by sea. he chief markets for sh at Billingsgate, for egetables, flowers, and fruit at Covent Garden, and for meat at Smithfield re of vast size, but inadequate to the demand. The trade of the port of ondon is mainly in imports, which amount in value to one-third of those f the whole country, and the tea and wine trades are almost monopolies f the port. The University of London, reorganised in 1901, has still its repu- ation to make, but it includes famous colleges, and the great medical schools f the large hospitals. The British Museum, with a library of 2,000,000 olumes, contains unrivalled collections of objects of antiquity and natural istory, and there are many special museums and art galleries. The

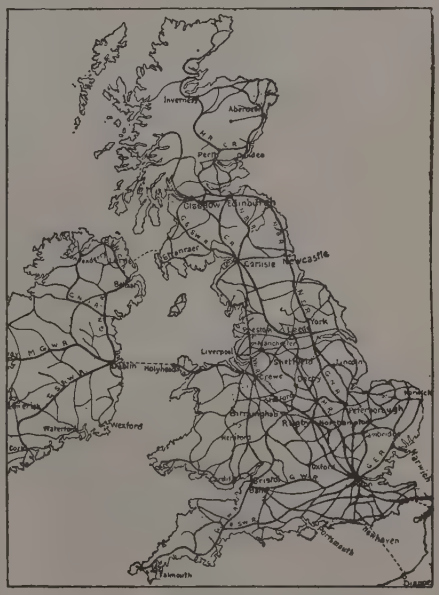


FIG. 87.—*Railways radiating from London.*

scientific societies of London are the headquarters of all branches o British science. The publishing trade has been centralised in Londo to a remarkable degree, almost all the publishers who made Edinburg famous as a literary centre early in the nineteenth century have remove to London, although much of the printing is done in other towns.

The Isle of Man.—The Isle of Man, lying in the Irish Sea, independent of either England, Scotlan or Ireland, a fact hinted at in its coat arms. The island enjoys complete hom rule; the legislative body, called the Hou of Keys, is composed of twenty-four lande proprietors. A governor is appointed b the British government to represent th Crown. The island is of great geologic interest, being composed, like the Lak District, mainly of Silurian rocks, patches Carboniferous limestone, and some boss of granite. The northern portion is a drif covered plain, but the centre and south the island are high, the highest point, Snaefell, slightly exceeding 2,00 feet. There are some important lead mines, and the mild climate is favourable to stock-raising. The little towns of *Ramsay*, *Douglas*, and *Castletown* on the east coast, and *Peel* on the west, attract a great number of summer visitors.

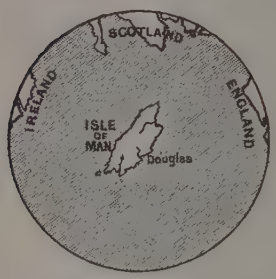


FIG. 88.—*The Isle of Man. The circle has a radius of 45 miles.*

FIG. 89.—*The "Arms of the Isle of Man.*

The Manx people are of Keltic origin, and their original language is not forgotten, being still taught in the schools in addition to English. The Church of England is established under the Bishop of Sodor and Man, a title which recalls a former grouping of the Isle of Man with the Hebrides

The Channel Islands.—The group of islands including Jersey Guernsey and Alderney, lying off the coast of Normandy, with which the were probably connected by land in prehistoric times, were part of th domains of William the Conqueror, and although th people are still of Norman race and French speech the islands have never formed part of France politi cally. The dialect of each island is peculiar to itself but all are derived from the *langue d'oil*, and modern French is used officially, but the use of English i rapidly spreading. Ecclesiastically they form part o the See of Winchester, and for some purposes they are attached to the county of Hampshire; but the islands are self-governing, and retain many curious privileges and quaint customs There is compulsory military service for all men in the militia. The islands enjoy a mild climate, and each possesses a special breed of cattle

FIG. 90.—*Arms of the Channel Islands.*

uable for dairy purposes. The fertility of the soil is great and the ding occupation is farming, or rather market gardening, for the farms ich belong to the peasantry are now very small on account of the ctice of dividing the land amongst all the is of a family. Early vegetables for the ndon market, and fruit, grown for the most t under glass, are the chief exports. The ached rocks about the larger islands and the id currents of the sea make navigation diffi- t and dangerous, but steamers run regularly the French ports from 15 to 30 miles away, l to Weymouth and Southampton, 90 and 150 es distant. Jersey, the largest island, has its ef town at *St. Helier*, and Guernsey, which is not much smaller, has a bour at *St. Pierre*. In addition to its farm produce Guernsey exports nite, particularly for paving.

FIG. 91.—*Area of English-speaking in Jersey* ("*Globus*," 1894).

IV.—IRELAND

By Grenville A. J. Cole,
Professor of Geology in the Royal College of Science for Ireland.

Position and Outline.—The name *Ireland* or *Eire-land*, according to dition, comes from that of *Eire* (earlier *Eriu*), one of the queens of the atha Dé Danann. Ireland stands on the edge of the European plateau, sea-floor sinking to oceanic depths on the west; while on the east it is ided from Great Britain by shallow seas, rarely deeper than 70 fathoms. ie western coast-line is deeply indented, and obviously reproduces the atures of the sea-lochs of Scotland and the fjords of Norway. The long ets are river-valleys that have been lowered beneath the sea, and the lls that bounded them now jut out as headlands into the Atlantic, their termost peaks forming characteristic chains of islands. The attack of e ocean-rollers has, in places, formed cliffs of considerable height; at eve Liag in Co. Donegal, and at Achill Island, there are almost sheer scents of 2,000 feet. The east coast of Ireland includes few fjords, ough the names of Wexford, Carlingford, and Strangford show how the pical structure even there impressed the Danish settlers. In general, owever, on the east there is a series of broad bays and accumulated nds, broken only here and there by some bold feature like Bray Head.

Surface and Structure.—The general form of the surface of Ireland sembles a shallow basin, the highlands being grouped along the coast. ie watershed between an eastern and a western group of rivers may be aced from Lough Foyle to Mizen Head, but is a sinuous line marked by special surface-features. In some cases rivers of both groups arise on pposite sides of the same central bog-land.

The Northern and Eastern Mountains.—The high plateaux of

the north-east are due to the outpouring of basaltic lavas, tier upon tier in Eocene times. Immense denudation has since gone on, and Lough Neagh has been formed by the fracture and subsidence of part of the volcanic area. The Mourne Mountains are formed of Eocene granite. The highlands of western Londonderry, Donegal, Mayo, and Galway are formed of far more ancient rocks. A series of folds running north-east and south-west determined the general structure of this region at the close of Silurian times. Here and there, portions of the still older floor of metamorphic rocks, on which the early Palæozoic strata were laid down, have been brought to light. The age, however, of many of the altered series is still uncertain. Errigal (2,466 feet), Croagh Patrick (2,510 feet), and the Twelve Bens (2,300 feet), are good examples of the conical mountains formed by the occurrence of hard bands of quartzite, at various horizons, in this antique region. The same system of north-east and south-west folds is traceable across Ireland wherever the older rocks appear through the Carboniferous coating. Silurian and Ordovician beds thus form a long ridge from near Dundalk through Co. Down, and the Newry granite comes up along this axis. In Leinster, again, a granite moorland, seventy miles long, forms a backbone to the province, flanked similarly by upturned Older Palæozoic strata.

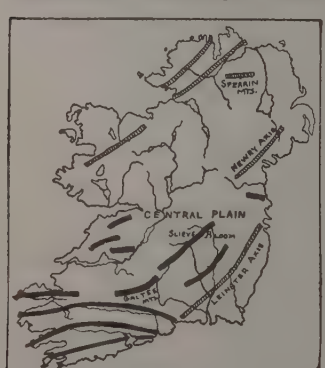


FIG. 92.—*The Axes of Folding of Ireland.*

The Southern Mountains.—The mountains on the south and south-west, on the other hand, have been determined by post-Carboniferous folding, and the axes here run east and west. The upward folds, or anticlines, have weathered out as ridges owing to the hardness of the Old Red Sandstone conglomerates, which have here been brought to the surface. The downward folds, or synclines, contain the softer Carboniferous limestone, which has been greatly worn down, forming a system of east and west valleys. Long stretches of the Suir, the Blackwater, the Lee, and the Bride thus follow the axes of folding. The abrupt bend southward in the lower part of the Blackwater and other rivers may be due to the interruption of their original courses by glacial material. The waters that once flowed on along the east and west synclinals thus overflowed into the channels of southward-running rivers, deepening them until they were continuous in each case with the main river-bed. When subsidence of the west coast occurred, the main valleys were already formed in the synclines, and the sea entered them between the anticlinal ridges of Old Red Sandstone, forming the inlets of Dingle, Kenmare, Bantry, and Dunmanus. Farther north, the same system of folding is manifest in the Galtee Mountains (3,000 feet), and in the axis of

e Felim and Slieve Bloom. In the latter region, however, the trend ıe ridges was diverted by the older series of folds (see black lines on 92).

The Central Lowland.—Central Ireland is, in general, a lowland, many brown bogs, stretches of green meadow, and numerous lakes, ous in outline, and enclosing abundant islands. The Carboniferous stone here covers an immense extent of country, and repeats, on the dest scale, the features seen in the compressed synclinals of the south. synclinal from the Leinster chain to the Slieve Bloom axis is 35 s wide; and thence a second still shallower one stretches to the of the Donegal and Mayo highlands. Clew Bay, with its host of ds, is merely a marine representative of the inland lakes. The broad of Carboniferous limestone retained in the central plain gives a orm character to the interior; and from Galway to Dublin, 115 miles, e is not a hill of any importance. Near Sligo, however, and in the of Clare, the same strata have been uplifted to form scarped and ıced mountains. The lower ground has served for the accumulation ands and gravels from the surrounding hills, the final distribution of ch has been largely influenced by the confluent glaciers of the Ice Age. Shannon and its important tributary, the Suck, run north and south ugh the plain. The former, if we include the Owenmore river, rises he moors of Cuilcagh, falls steeply at first, and then has a gentle course ver 200 miles. It thus appears mainly as a broad lowland stream, ading out to form Loughs Allen, Boderg, Forbes, Ree, and Derg. At ıloe it cuts for a time through mountainous country, and forms a series ıpids at Castleconnell on its way to Limerick.

Minerals.—The Coal Measures, lying above the Carboniferous lime- e, have been preserved only in a few isolated basins. The coal, eover, is of an anthracitic character, except near Lough Allen and ıgannon. This fact has caused the manufacturing centres to lie almost rely on the east coast, where coal from Scotland or England can be ıined by cheap sea-carriage. The Dungannon Coal Measures are ly overlain by New Red Sandstone, and are thus capable of further elopment. Active iron-mining in Ireland is confined to the pisolitic s of Co. Antrim, which are interbedded, as old lake-deposits, in the ene basalts. Bauxite is worked, for aluminium, in the same district. k-salt is mined near Carrickfergus, and barytes in Co. Cork. per and lead are now very little worked, even in Co. Wicklow. e abundant discoveries of prehistoric gold ornaments in Ireland go to show that alluvial gold was at one time common in the country; the supply was probably soon exhausted. The quartz-rocks of Cos. negal and Wicklow have been indicated as the source; and small gets have been found in the latter county in historic times, while the rtzites contain recognisable quantities of gold upon assay. Grains of d are still obtained by washing the sands of some streams near Arklow.

The compact grey limestones of the central counties, and the fine grained sandstones of Donegal are used for city-buildings. The black marbles of Galway and Kilkenny, the red from Co. Cork, and the unique green serpentinous marble of Connemara, are used for decoration. Grey granite is quarried at Newry, and red granites occur in Co. Galway and elsewhere. Hard flags occur in Co. Clare. The cost of carriage and of working retards the Irish stone industry. The one material excavated with unfailing regularity is peat—locally called turf—which is extensively used for fuel.

Fauna and Flora.—The exceptional features of the fauna and flora of Ireland have been previously referred to (p. 142).

People and History.—Separated from South Wales by some 50 miles, and from Scotland at one point by only 13 miles, and with the broad Atlantic on the west, it is clear that the natural incorporation of Ireland in the British Isles has profoundly influenced her history. Her insular position laid her open to attack from a variety of nations, at a time when journeys by sea were simpler than those by land. The early settlers in Ireland appear to have come in some small degree from southern Europe, but mainly from the Keltic tribes of Gaul and Britain ; but these invaders found men of the Stone Age already in occupation. Though the characteristic civilisation and language of the country thus had a Keltic origin, anthropological research shows that the people are non-Keltic and of still earlier type. The distinctive characters of the peasantry are not confined to those who still speak the Irish language. Courtesy, quickness of idea, a delicate or humorous aptness of expression, a conservatism of method, and a deep sense of the supernatural in ordinary life, are features of the agricultural community, and imply less mixture of race than might have been expected from the frequent immigrations. The dominant tribe became ultimately known as the Scots, who occupied the plain holding the country from the centre, much as the Magyars now hold Hungary. These Scots and their subject tribes invaded Wales and Cornwall. A colony in Galloway spread northward, and gave its name to Scotland. The Romans never established themselves in Ireland ; but in the middle of the fifth century St. Patrick successfully introduced Christianity, and the country still abounds in Christian monuments erected by his monastic successors. The round towers are now believed to belong mostly to the ninth century. Ecclesiastical learning and art flourished and Irish missionaries spread into central Europe. The seizure of the harbours by Danes and Norwegians from 800 A.D. onwards checked external enterprise ; but the development of the towns of Dublin, Wexford, Waterford, and Limerick, as commercial centres, dates from this invasion. Dublin became the centre of Norse power in Ireland, while rival Irish kings strove for inland supremacy. Brian, however, drove the Danes from Limerick in 968, and broke their power at Clontarf in 1014. They held Dublin. Wexford. and Waterford till the Norman inva

n under Richard de Clare in 1170. The Anglo-Norman governors ɔn regarded themselves as local Irish chieftains, and their insular ɜition often overcame their loyalty, despite the existence of an official ɔeroy in Dublin. This defection of many of the settlers reduced the glish district to a small area round Dublin. Henry VIII. came to be led king of Ireland, and drew to his side those who had long looked a central authority. But no English predominance was estab- ɪed until after the wars of extermination carried on by Elizabeth's ɪerals. The virtual forfeiture of Ulster by the government of James I. to the introduction of sturdy English settlers on an organised basis, d the name of Londonderry records the source of many of the colonists. e emphasis laid upon religious differences resulted in a bitter rising in 41, the ultimate suppression of which was left to Cromwell. The loyal rty under William III. secured the passing of "penal laws," whereby ɪd and other property were gradually brought into the hands of the otestants. The export of wool was forbidden, and, outside the district the linen industry, the people were driven to rely on agriculture alone. ɪe conciliatory measures of the Dublin parliament came too late to eck the sanguinary rebellion of 1798. Parliamentary union with Great itain took place in 1801, and in 1829 Roman Catholics were first allowed sit in parliament. To this day the country presents suggestive traces its comparatively recent colonisation in the sixteenth and seventeenth ɪturies. In 1901 the Roman Catholics numbered 74 per cent. of the tire population.

Present Economic Condition.—The growth of population was ɔid between 1800 and 1845, and the general reliance on the potato as a ɪrce of food led to the disastrous famine of 1846, when the potato crop led. The western peasantry, isolated in small bodies among the moun- ns, naturally suffered most, even when relief had been freely supplied ɔm England. A steady decline in population has since gone on. The ɪ has provided a simple means of exodus to America, just as in old times served as a means of approach. At the present time the country appears be increasing in prosperity, and much is being done, by legislation and ivate effort, to maintain the population on the soil. In former days ɪter-power was largely used for mills, and the formation of reservoirs ɪy again utilise the rainfall. From poverty in coal, the country must ways depend largely on systematic agriculture and grazing. Of late ars crops have been neglected, while large numbers of cattle have been ported. In the north, flax is cultivated, as a basis for the flourishing ɪen-industry. Shipbuilding prospers in Belfast. Distilling and brewing e important in the large towns. Cloth and lace are manufactured locally· ɪe sea-fisheries have largely developed. Butter and bacon form the main ports of the south and south-west. The Congested Districts Board, the ɔnstruction of "light railways," and the new department of Agriculture and ɛchnical Instruction have done much to stimulate industry. Many lines

of steamers connect the eastern ports with England and Scotland; and American liners call at Queenstown, and at Moville on Lough Foyle.

Divisions and Towns.—The division of Ireland into provinces, under an over-lord, dates from prehistoric times, though the boundaries have slightly varied. The provinces are divided into counties, and these into baronies, which mostly bear ancient and interesting Gaelic names.

Leinster includes the twelve counties of Louth, Longford, Westmeath, Meath, Dublin, King's Co., Queen's Co., Kildare, Wicklow, Kilkenny, Carlow and Wexford. The north consists largely of a Carboniferous limestone plateau, used for grazing. The Boyne rises in the bogs near Edenderry, and runs through a wooded valley below Navan. *Drogheda* occupies its mouth, on a good inlet for shipping. The Liffey rises in the Wicklow Mountains, makes a loop of 75 miles through the plain, and enters the sea at Dublin Bay. A wooden bridge was erected across it here

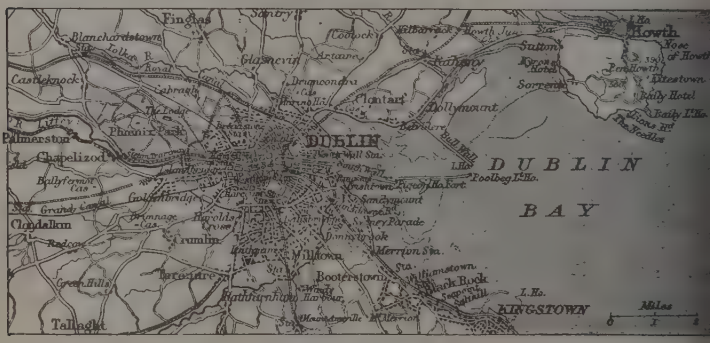


FIG. 93.—*Dublin.*

in ancient times, and Dubh-linn, the Black Pool, became the site of a town guarding the passage. The bay, sheltered between the hills of Howth and Dalkey, was accessible both to Norsemen and English; and *Dublin* became the capital of the invaders. It is the seat of the Viceregal court, and of the Dublin University, founded in 1591; also of the Royal University. There are several important libraries and museums. The quays on the Liffey serve for a good import and export trade; the mails cross to Holyhead from *Kingstown*, a fine harbour six miles down the bay. The city has of late extended greatly on the south. The old quarter round the Castle and Cathedrals is poor and dilapidated; but the expansion in the eighteenth century provided Dublin with many handsome public buildings, classical in style. Dublin is mainly an administrative and professional city, but has large breweries, mineral water factories, chemical works, and other manufactures. South of Dublin, Leinster broadly divides itself into the mountain axis on the east, and the western Carboniferous

clinal, including the pastoral lowlands of Kildare and the high Kilkenny
l-field. Beyond the Slieve Bloom range, the King's County stretches
ne Shannon. The Nore and the Barrow run north and south on either
: of the coal-field, uniting at *New Ross* in a navigable channel. The
nster granite chain rises to 3,039 feet in Lugnaquillia, and forms a long
orland, commonly 2,000 feet above the sea. The flatter ground east of
chain widens towards the south, where *Wexford* town has a fair ship-
g and agricultural trade.

Ulster includes the nine counties of Donegal, Londonderry, Antrim,
one, Fermanagh, Cavan, Monaghan, Armagh, and Down. The planters
he seventeenth century introduced a virile and enterprising element.
migration from Scotland took place at various times ; and a great part of
population remains Presbyterian. Antrim contains high basalt plateaux,
columnar jointing of the lavas being admirably seen in the Giant's
seway near Portrush. *Belfast* (*Beal feirste*, the "ford of the sandbank")
occupied by the Normans, and was finally secured for England in 1573.
: steady growth of trade in the port, and of the linen and shipbuilding
ustries, have raised the population from 30,000 in 1810 to some 350,000
ne present day. The modern city has handsome well-kept streets, with
spicuous commercial buildings. The Queen's College is on the south,
there are seven public parks. The shortest route to Britain is from
ne, some 20 miles to the north. The basalt plateaux fall towards
igh Neagh, the largest lake in the British Isles. The Bann runs through
continuing as a broad stream to the sea at *Coleraine*, 100 miles
n its source in the Mourne Mountains. *Londonderry*, still walled, rises
uresquely on the west bank of the Foyle, and has large agricultural
orts. From the Sperrin Mountains across Donegal there stretches a
antic highland, mainly occupied by Irish-speaking people. The south-
t of Ulster is less rugged, and the scenery of the two Loughs Erne
duates into that of the plain. An agricultural country of green rounded
s extends from this point eastward. The Mourne Mountains occupy
south-east of Co. Down, Slieve Donard (2,796 feet) and Slieve Bingian
49 feet) being conspicuous summits.

Connaught includes the five counties of Mayo, Sligo, Leitrim, Galway,
Roscommon. It lies almost entirely west of the Shannon, and its
nparatively poor lands were often occupied by persons ejected from the
. In the mountains of Galway and southern Mayo lies some of the
st beautiful scenery of Ireland ; but the whole area eastward belongs to
limestone plain. Loughs Conn, Mask, and Corrib are thus broad sheets
water, with low eastern and mountainous western shores. The popula-
n of the Connaught highlands is thickest along the coast, and is engaged
fishing. The towns of *Galway* and of *Sligo* are thus fishery-centres.
e former stands at the outfall of Lough Corrib, and is a natural port for
trade of Galway Bay, which runs 30 miles west to the open ocean.

Munster includes the six counties of Clare, Limerick, Tipperary, Kerry,

and Cork. The indentations of the coastline render it highly picturesque. The warm south-westerly winds preserve a richness of vegetation, except on the limestone terraces of Clare. Co. Tipperary consists partly of the plain, partly of the Old Red Sandstone ranges. The acropolis of *Cashel* is one of the most remarkable groups of antique buildings in Europe. *Limerick*, despite its trade in bacon and agricultural produce, has felt the effects of decreased population. It has a beautiful situation on the Shannon above which the Norman stronghold rises. The east and west mountain ranges occupy most of Cos. Cork and Kerry, culminating in Carrantuohil (3,414 feet), a peak in Macgillicuddy's Reeks. The lower lake of Killarney belongs to the plain, while the upper is enfolded in wooded mountains. The population of Kerry preserves many ancient characteristics, and dwells mostly on the coast. The island of Valentia is a starting-point for one of the most important transatlantic cables. In the east, Munster becomes richer and more cultivated; the Suir and the Blackwater often run between high banks of woodland. *Cork*, the third largest city in Ireland, is well built upon the Lee, and its suburbs run down towards *Queenstown*, a station for the American mails. The winding but spacious harbour is set with wooded islands. The chief trade lies in agricultural exports. *Waterford*, founded by the Danes, occupies a similarly sheltered position on the inlet of the Suir, and has a corresponding trade with England. The east and west ranges that form the south of Ireland are here broken by St. George's Channel, and we pass somewhat abruptly to the foot-hills of the Leinster chain.

STATISTICS OF THE UNITED KINGDOM.

	1881.	1891.	1901.
Area of the United Kingdom in square miles..	120,979	120,979	120,9
Population „ „	35,241,482	38,104,975	41,605,3
Density of population per square mile	291	314	3

DISTRIBUTION OF POPULATION.

	England.	Wales.	Scotland.	Ireland.	Isle of Man.	Channel Islands.	Abroad
1881 ..	24,613,926	1,360,513	3,735,573	5,174,836	53,558	87,702	215,3
1891 ..	27,483,490	1,519,035	4,025,647	4,704,750	55,608	92,234	224,2
1901 ..	30,805,466	1,720 609	4,472,103	4,456,546	54,758	95,841	—
Area, sq. miles	50,867	7,442	29,785	32,583	227	75	—

THE MOST POPULOUS COUNTIES[2] IN 1901.

Name.	Area, sq. miles.	Population.	Name.	Area, sq. miles.	Populatio
London	118	4,536,063	Essex	1,533	816,50
York	5,939	1,891,726	Middlesex	233	792,22
Lancaster	1,757	1,827,391	Chester	1,009	601,07
Lanark	882	1,339,289	Devon	2,597	437,21
Kent	1,519	936,003	Cork	2,890	404,81
Stafford	1,142	879,618	Edinburgh	362	488,64
Durham	999	833,614	Antrim	1,237	461,24

THE LEAST POPULOUS COUNTIES[2] IN 1901.

Name.	Area, sq. miles.	Population.	Name.	Area, sq. miles.	Populatio
Nairn	195	6,291	Bute	218	18,78
Kinross	73	6,980	Rutland	152	10,79
Peebles	355	15,066	Radnor	471	23,26

[1] Takes account only of soldiers and sailors. [2] County boroughs not included.

THE LARGE TOWNS OF THE UNITED KINGDOM.[1]

ame.	1881.	1891.	1901.	Name.	1881.	1891.	1901.
DON (County)	3,816,483	4,232,118	4,536,063	PLYMOUTH ..	73,795	87,480	105,404
SGOW ..	674,095	703,320	735,906	Hanley	75,912	86,645	100,290
ERPOOL ..	552,508	584,499	684,947	SOUTH SHIELDS..	56,875	78,391	97,207
CHESTER ..	341,414	505,368	543,960	Dudley	87,527	90,252	96,988
ningham ..	400,774	478,113	522,182	Huddersfield ..	81,841	96,405	96,383
ds	309,119	367,506	428,953	Burnley	63,638	86,034	95,816
field	284,508	324,243	380,717	SWANSEA	73,971	90,349	94,514
LIN	349,648	354,277	379,861	Stoke-upon-Trent	64,091	75,352	89,023
FAST	208,122	255,950	348,876	Ystrad-y-fodwg ..	—	88,351	88,968
STOL	206,874	286,231	321,908	Halifax	73,630	89,832	88,909
nburgh ..	236,002	261,225	316,479	Walsall	59,402	71,789	80,440
Ham	128,953	204,902	267,308	HARTLEPOOL ..	46,990	64,882	86,310
L	165,690	200,044	239,876	St. Helens ..	57,403	71,288	80,722
ingham ..	186,575	213,877	239,753	Paisley	55,638	66,418	79,355
lford	183,032	216,361	228,667	Stockport.. ..	59,553	70,263	78,871
FORD	176,235	198,136	220,956	CHATHAM ..	46,788	59,210	78,746
WCASTLE ..	145,359	186,300	214,803	GRIMSBY	45,351	58,661	78,198
ester	122,376	174,624	211,574	DEVONPORT ..	63,980	70,204	78,059
nam	111,343	183,871	194,197	LEITH	59,485	67,700	76,667
verhampton	164,332	174,305	192,750	Rochdale	68,866	71,401	76,122
TSMOUTH ..	127,989	159,251	189,122	Northampton ..	57,544	70,872	76,073
DIFF	82,761	128,915	164,420	CORK	80,124	75,345	75,978
DEE	140,239	153,051	160,871	*York*	61,166	67,004	75,391
DERLAND ..	116,542	142,248	159,359	Dewsbury	69,566	72,896	74,349
hton	107,546	142,129	153,393	Wednesbury ..	68,142	69,083	72,478
RDEEN ..	105,189	121,623	143,932	Stockton-on-Tees	55,460	68,875	71,812
don	78,953	102,697	133,885	GREENOCK ..	65,884	63,096	67,645
on	105,414	118,730	130,602	NEWPORT (Mon.)	38,427	54,707	67,509
kburn ..	104,014	120,064	127,527	IPSWICH	50,546	57,360	66,622
thyr Tydfil ..	91,373	104,021	122,536	*Reading*	46,054	60,054	65,468
THAMPTON ..	84,384	93,589	120,302	West Bromwich..	56,295	59,474	65,172
STON	96,537	111,685	118,220	Warrington ..	45,253	55,349	64,702
DLESBROUGH	72,661	98,932	116,539	Coventry	46,563	54,755	63,817
wich	87,842	100,970	111,728	*Hastings*	47,619	60,878	62,913
KENHEAD ..	84,006	99,857	110,926	Wigan	48,194	55,013	60,770
ESHEAD ..	65,803	85,692	109,887	Bury	53,240	57,212	58,028
by	81,168	94,146	105,785	*Bath*	53,875	54,551	52,751

AGRICULTURE OF THE UNITED KINGDOM.

	Wheat.	Barley.	Oats.	Turnips.	Potatoes.
es in 1874	3,819,011	2,500,217	4,076,570	2,466,823	1,412,851
„ 1886	2,355,457	2,423,060	4,403,579	2,302,219	1,353,808
„ 1895	1,454,173	2,337,929	4,512,306	2,229,183	1,251,703
„ 1900	1,898,863	2,164,438	4,131,138	1,986,465	1,215,440

MINERAL PRODUCTION OF THE UNITED KINGDOM.

	Coal.		Iron Ore.		Pig Iron manufactured.
	Amount, tons.	Value, £.	Amount, tons.	Value, £.	Tons.[2]
..	132,654,887	46,429,210	15,726,370	5,609,507	6,300,000
..	169,935,219	42,971,276	14,590,713	3,501,317	7,898,000
..	195,361,260	57,190,147	13,700,746	3,150,424	8,659,681
..	225,181,300	121,652,596	14,028,208	4,224,400	8,959,691

TOTAL IMPORTS OF RAW COTTON INTO UNITED KINGDOM.

(In million pounds weight.)

r	1820.	1840.	1860.	1880.	1901.
ount	152	592	1,391	1,629	1,830

ANNUAL TRADE OF THE UNITED KINGDOM.

	1871–75.	1881–85.	1891–95.
orts	£360,204,000	£399,584,000	£417,791,000
orts[3]	239,502,000	232,272,000	226,969,000
exports[4]	58,184,000	63,038,000	60,533,000

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[1] SEAPORTS in small capitals, *other towns* not near coal-fields in italics.
[2] From native and imported ores.
[3] Of British produce.
[4] Of foreign produce previously imported.

THE BRITISH EMPIRE IN 1901.[1]

(*Approximate.*)

	Area, sq. miles.	Population.	Shipping: tonnage entered and cleared
United Kingdom	121,000	41,500,000	98,500,000
Indian Empire	1,640,000	294,000,000	8,000,000
Colonies :—			
Gibraltar	2	27,000	8,700,000
Malta and Gozo	120	183,000	7,000,000
Aden and Perim	80	41,000	4,900,000
Ceylon	25,400	3,600,000	7,400,000
Straits Settlements	1,500	580,000	13,300,000
Hongkong	400	384,000	14,000,000
Basutoland	10,300	250,000	—
Cape Colony	277,000	2,350,000	9,500,000
Natal	29,200	930,000	2,800,000
Orange River Colony	48,300	207,500	—
Transvaal Colony	119,100	1,094,000	—
Gambia	70	13,500	260,000
Gold Coast	40,000	1,500,000	1,400,000
Lagos	3,500	42,000	1,070,000
Sierra Leone	4,000	75,000	1,290,000
Mauritius	880	394,000	670,000
Seychelles	150	20,300	320,000
Ascension and St. Helena	80	10,000	300,000
Dominion of Canada	3,049,000	5,370,000	14,170,000
Newfoundland and Labrador	162,000	210,000	1,450,000
Bermuda	20	17,500	730,000
British Honduras	7,500	37,000	340,000
Bahamas	5,400	53,700	1,110,000
Jamaica and Turk's Island	4,400	758,000	2,030,000
Leeward Islands	700	128,000	1,050,000
Windward Islands	500	160,000	2,570,000
Barbados	170	195,000	1,360,000
Trinidad and Tobago	1,800	272,000	1,200,000
British Guiana	120,000	288,000	700,000
Falkland Islands	7,500	2,000	160,000
Fiji	7,700	120,000	190,000
British New Guinea	90,500	350,000	40,000
New Zealand	104,000	772,000	1,680,000
Queensland	670,000	497,000	1,650,000
New South Wales	310,000	1,353,000	8,100,000
Victoria	88,000	1,200,000	5,870,000
Tasmania	26,000	166,000	1,230,000
South Australia	903,000	363,000	3,690,000
Western Australia	976,000	182,000	3,200,000
Total, United Kingdom, India, and Colonies	8,856,000	359,875,000	233,920,000
Protectorates, &c. :—			
Asia	120,000	1,200,000	—
Africa	2,160,000	35,000,000	—
Pacific Islands	800	30,000	—
Total, British Empire	**11,137,000**	**396,100,000**	—

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[1] Generalised from *The Statesman's Year Book* for 1902.

CHAPTER XIII.—THE SCANDINAVIAN KINGDOMS

I.—THE SCANDINAVIAN PENINSULA

By Yngvar Nielsen,[1]
Professor of Geography in the University of Christiania.

Position and Extent.—The two kingdoms of Sweden and Norway upy the whole Scandinavian Peninsula from Knivskjelodden (71° N.) r the North Cape to Smyge Huk (55½° N.), in Scania; and from the nd of Būland (4½° E.) to the meridian of Vardö (31° E.). The breadth he peninsula varies from 230 to 470 miles, and the length is 1,160 miles. e long west coast faces the Atlantic and the North Sea, and the harbours ıg its whole extent remain unfrozen all the year round. At Lindesnes coast bends to the east along the Skagerrak, which then runs north- ·d into Christiania Fjord, while the Kattegat runs southward along west coast of Sweden. The Öresund, or Sound, separates Scania, extreme south of the peninsula from the Danish Islands. The Baltic ns north-eastwards along the east coast to the Åland Islands, and is ıtinued northward by the Gulf of Bothnia, north of which the Scandi- ·ian Peninsula is attached to the mainland of Finland and Russia by an ımus three hundred miles across. On the east coast of the peninsula, ›ecially in the Gulf of Bothnia, the harbours may be blocked by ice for as .ch as six months of the year. With the exception of Russia, no other ıntries in Europe stretch over so great an extent in latitude. While the ıth of Sweden lies in the same latitude as the Cheviot Hills, Stockholm ; parallel with the Orkney, and Bergen with the Shetland Islands; and the north the peninsula passes far beyond the Arctic Circle.

Norway and Sweden share the geographical unity of the peninsula ıich can be described as a whole; but the historical development of the o countries has been very different, and for internal politics they are tirely independent of one another; hence in these aspects they must separately described. The names Norway and Sweden may be con- niently used in the physical description as generally corresponding to e western and eastern slopes of the peninsula.

Geology.—The Scandinavian peninsula is built up for the most part of ry ancient rocks. In Norway the Archæan rocks are widely spread in ·e south-east, and often penetrated by masses of granite and gabbro,

[1] Translated from the German by the Editor.

while Silurian formations are spread over a large area round Christiania Fjord and the lakes in its neighbourhood. Archæan rocks come to the surface also over all southern and western Norway, but in the interior of the country they are overlaid by sparagmite, and different schists and limestones, quartzite also appearing on the high mountains. In the Jotun mountains all these strata are broken through by masses of gabbro. Throughout the Trondhjem district schists are greatly developed, while further north the Archæan rocks reappear, pierced by intrusions of granite. The Lofoten Islands, like the neighbourhood of the Lyngen Fjord, are masses of gabbro. Ancient sandstones are widely distributed in Finmarken. Archæan formations also predominate in Sweden, where they are in part overlaid by Cambrian and Silurian strata, especially round the great lakes; only in Scania, in the extreme south, do Triassic, Jurassic, and Cretaceous rocks appear. The large island of Gottland belongs entirely to the Upper Silurian formation. Where the ancient rocks do not themselves appear on the surface in the peninsula, glacial formations, clay, gravel, and sand cover extensive areas. Fertile patches covered by good soil are also found, especially in Sweden, where the principal agricultural districts are in Scania and East and West Gothland. In Norway fertile land occurs only on the margins of Christiania Fjord, the lakes of Tyrifjord, Randsfjord, and Mjösen, and of Trondhjem Fjord. The soil is favourable for the growth of forests in most places; between 50 and 60 per cent. of the area of Sweden is wooded, but in Norway only about 20 per cent. on account of the greater elevation of the country.

Configuration.—The Scandinavian Peninsula on the whole forms a plateau. In the east and south the elevation is small, but towards the west the land rises gradually, and reaches its maximum height in a great ridge near the west coast. This ridge from north to south forms the main watershed of the peninsula, and the boundary between the two countries runs along it for a great part of its length. Thus it comes about that only a small portion of Sweden is mountainous, while Norway is, next to Spain, the most conspicuously mountainous country in Europe. In the west the narrow fjords penetrate steep-walled, rocky gorges for ninety miles or more from the sea, while on the east long and sometimes wide valleys provide more gradual access to the high mountain regions. In the Jotunheim, where the peninsula reaches its greatest height, Glittertind attains 8,380 feet, and Galdhöpiggen 8,400 feet, and further west Store Skagestölstind, 7,861 feet. In the far north the mountains rising directly from the sea reach a considerable height, some exceeding 6,000 feet. The greatest heights in the north-west of Sweden are Kebnekaise (7,004 feet) and Sarjektjokko (6,988 feet). Southern Sweden contains a hilly district, cut off from the mountains of the north by the depression of the large lakes.

Numerous snowfields and glaciers are formed in the great mountains, especially in the north and towards the west coast. In the south of Norway the Folgefonn, Jostedalsbræ, Aalfotebræ, and Hardangerjökel are

most important, and in the north Svartisen, Heldalsisen, and Frostisen. largest expanse of snow is the Jostedalsbræ, which reaches a height ,800 feet, and is surrounded by other great snowfields; twenty-four iers of the first rank flow from it. The large glaciers of the eastern e are confined to the far north.

On account of the character of the soil and of the great average ation the quantity of absolutely useless land is very great. In Norway 3,500 square miles of land are available for agriculture or pasturage, in Sweden more than 19,000 can be utilised.

Coast.—The coast is extraordinarily broken and indented; not only are e numerous fjords and bays, but in most places innumerable off-lying nds forming the *Skjaergaard* ("Skerry wall") protect the coast, and give distinctive character. In Norway large islands lying far from the main- take the place of the Skjaergaard in the th; the largest of these groups are those of Lofoten and Vesteraalen. Between many the islands tremendous currents are formed the tide, amongst them the famous Malström ween Værö and Moskenesö, the appearance effects of which were greatly exaggerated by writers. The large and interesting islands of tland and Öland lie off the coast of Sweden he Baltic. The total area of all the islands nected with Sweden is about 3,000 square es, and of those connected with Norway about 00.

FIG. 94.—*Portion of the Coast of Norway 70 miles by 40 showing over 400 islands*

The formation of the coast with the off-lying nds affords innumerable sheltered harbours fishermen; and many banks frequented by at shoals of cod occur in the broad Vestfjord, t of the Lofoten Islands.

Lakes and Rivers.—While the average proportion of Europe occu- d by lakes and rivers is only 0·5 per cent. of the area, the percentage of area of lakes and rivers in Norway is 4, and in Sweden it is as much 8. The rivers are frequently broken by picturesque waterfalls. The ers on the eastern side of the main watershed are of course the longest. eral long rivers from the southern Norwegian mountains converge Christiania Fjord, the Glommen which flows south through the Österdal, l its tributary from the Gudbrandsdal being the chief. Many long ers with numerous lakes in their course cross Sweden from west to east oughout its whole length. The Klarelf, the greatest Scandinavian river, is southward to Lake Vener. The depression of the great lakes lies to north of the plateau of southern Sweden, from which short streams are eived by Lake Vetter, and discharged eastward by the large Motala er to the Baltic. The lakes of this depression are four in number—

Lake Vener (2,100 square miles in area, the third greatest lake of Europe) lies on the west, and drains to the Kattegat through the Götaelf, the continuation of the Klarelf, then Lake Vetter (730 square miles), and north-east of it Lakes Hjelmar and Mälar draining to the Baltic. On account of their low elevation and their central position these lakes have been largely utilised as means of communication by the construction of canals which unite the lakes to each other and to two seas. They have thus been of the utmost service in the material development of Sweden.

Climate.—Compared with other northern countries, the climate of Scandinavia is very favourable. On account of its great range of latitude there is necessarily a marked difference between the south and the north, and on account of exposure to prevailing winds the west has a much milder climate than the east; the annual isotherm of 45° F. is found on the west coast at Ullensvang in 60° N., and towards the east coast at Lund in 56° N. lat. The greatest cold in winter is experienced in the interior of northern Sweden and in Finmarken. The majority of the population of Norway, living upon the coast, enjoys much milder conditions than the people of Sweden, whose country is more exposed to continental influences; but the high valleys of Norway have a very severe and unfavourable climate. The rainfall is greatest on the Norwegian coast, where in winter rain and fog are very common, and there is comparatively little snow, though violent storms often occur. At Dombesten the annual rainfall is 79 inches, and in Florö in 61½° N. it is 74; but the general rainfall along the Norwegian coast is estimated at from 32 to 35 inches. At Christiania the rainfall is only 28 inches, and on the high plateau of the Dovrefjeld it is under 14. The greatest rainfall in Sweden is on the west coast facing the Kattegat, where 35 inches are recorded; but the east coast is very much drier, the fall at Kalmar being only 13 inches: thus the contrast between the mild and moist sea climate of western Norway and the dry continental climate of eastern Sweden is complete. The curves in Fig. 95 contrast the temperature and rainfall of the west coast of Norway with those of the most extreme continental climate in the world. In winter most of Scandinavia is covered with snow, and the peasants then employ *ski* or long snow-shoes, in the use of which they are very expert.

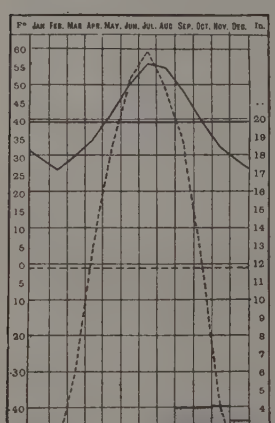


FIG. 95.—*Monthly Rainfall and Temperature for Bodö (Norway) and Verkhoyansk (Siberia).*

People and History.—The great body of the population of the peninsula belong to the Scandinavian family of the Teutonic race. In

early times the Lapps entered from the north along the central range
ountains. At a remote period a great immigration of Finns took
in the north of the peninsula, and another immigration of these
c in 1600 was directed to the central parts of the country. The
linavians have long been divided into Norwegians living in Norway
Swedes in Sweden; originally of the same stock, they have become
and more distinct. In the Middle Ages the Swedes were composed
o originally independent peoples, the *Svear* in the north, and *Götar* in
outh. The bright sonorous Swedish language is derived through a long
y from the earliest common linguistic stock of Scandinavia, whilst
vay, during its union with Denmark, adopted Danish and lost its old
uage, the Norröna, from which the dialects still spoken are derived.
orway has formed a separate kingdom since 872; and in the ninth
ury also the Swedish lands were united under a single king. From
ime the two nations have gone their several ways, as indeed they had
in the earlier viking period when the Norwegians carried their con-
s towards the British Islands, the Swedes towards Russia. Early
vegian civilisation has been influenced from the west, particularly from
and, with which intimate relations were long maintained, while
len has had more dealings with the east and with the south.
early Norwegian kings ruled over the Scottish Islands. In the
enth century the Swedes established a firm footing in Finland.
n Margaret founded the Scandinavian Union of three nations in
and a long period of unrest followed. Sweden broke from this
n under Gustavus Vasa; but the less powerful Norway remained
r Danish domination, and from 1537 to 1660 was a subordinate
dom. During this period Sweden attained its climax of national
tness, and, especially during the Thirty Years' War under Gustavus
phus, occupied a distinguished place amongst the European Powers.
ral provinces of Norway and Denmark were incorporated, and
den became the most powerful country of the north; but during the
wars of Carl XII. this place was lost, and Sweden fell under foreign
ence, from which it was saved by Gustavus III., through his revolution
772. His son, Gustavus IV., involved the country in war with Russia
lost Finland in 1808. The Revolution of 1809 placed Carl XIII. upon
hrone of Sweden. In 1810 the French Marshal Bernadotte, under the
e of Carl Johann, was elected Crown Prince and succeeded in 1818.
idea of a union between Sweden and Norway, which had long been
ontemplation, was rendered possible by the disruption of the bond
veen Norway and Denmark by the Kiel Treaty of 1814. Norway had
rst proclaimed itself a separate kingdom, but the envoys of the Great
ers induced it to withdraw this proclamation after a short war;
a Norwegian national assembly then chose Carl XIII. as king of
way, and on his death the Bernadotte dynasty succeeded peaceably to
n kingdoms.

Since 1814 the history of both nations has been a record of great economi progress and of unbroken peace. Yet the hope of a complete incorporatio of the two peoples once entertained by the Swedes, has not been fulfilled Since 1885 the question of separate consular an diplomatic representation for Norway, in accord ance with the spirit of the agreement of 1814, wa a source of growing friction, and in 1905 the unio was peaceably dissolved, Sweden retaining the ol King, while the people of Norway adopted as thei monarch a prince of the Danish royal house.

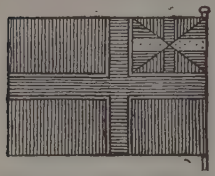


FIG. 96. — *The Former Norwegian Merchant Flag.*

The former flags of Norway and Sweden passe out of use, being altered to suit the new conditio of things by the omission of the badge of union.

The Lutheran church has been established since the sixteenth centur in both kingdoms.

SWEDEN

Government, People and Resources.—The name of Sweden i in the language of the country *Sverige, i.e.*, the kingdom of the Svears The government, with its seat in Stockholm, where the King also resides, consists of a Minister and nine Councillors of State, these seven being heads of departments. The Swedish Parliament consists of two chambers, the elective franchise for both being limited.

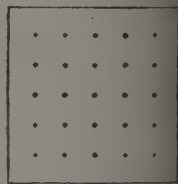


FIG 97.—*Average popu lation of a square mil of Sweden.*

The population of Sweden is mainly agricultural, and several parts of the country are particularly well suited for the rearing of live stock. The most fertile districts are in the provinces of Scania and Halland, the Baltic Islands, the coast of Småland and western and eastern Gothland. Forestry is a very important source of wealth, the export of timber and fores products having the first place in the trade of the country. The tonnage of the merchant fleet is about 500,000. The Swedes have long been cele brated for their industries and for their excellent technical institutions; in recent years the progres in industrial matters has been rapid, the wate power of the numerous rivers being largely utilised. The country possesses immense mineral wealth, particularly in iron, and Swedish mining has long been famous and has played a great part in the development of the country. The country is divided into separate mining districts known as *bergslager*. At the present time the immense deposits of very rich iron ore in Lappland, especially at Gellivara,

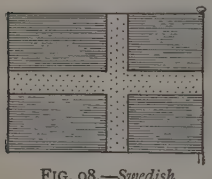
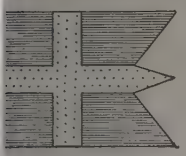


FIG. 98.—*Swedish Merchant Service Flag.*

e the first place. The principal copper mines are at Falun, zinc is pro-ced at Ammeberg, and silver at Sala ; but there is scarcely any coal in country except in Scania. Swedish iron has a reputation all over the rld for its purity. The United Kingdom and Germany come first in the foreign trade, then Denmark, Norway, Finland, and Russia.



G. 99.—*Swedish Naval Ensign.*

The means of communication are excellent in parts, and everywhere good. A network of roads extends over the whole country. The admirable natural waterways have been improved by the construction of canals, of which the most important is the system between the Kattegat and the Baltic, including the Trollhätta and Göta canals and the great es. Steamer communication is kept up on the internal waterways and ng the coast during the open part of the year. The railway system has en steadily improved, and Sweden now possesses a greater extent of rail-ys in proportion to inhabitants than any other country in Europe. The stem is naturally most developed in the lowlands in the south, but it ends also far to the north. The principal mail routes to the continent from Stockholm to Trelleborg, and thence across the Baltic to Sassnitz Rügen ; and from Göteborg to Copenhagen by railway ferry at Helsing-rg (Fig. 107). Telegraph and telephone systems are highly developed.

Education is general, almost every one can read and write ; the school stem is well organised and attendance is compulsory. There is a large d well-disciplined army, and the fleet, although formerly neglected, has cently been improved d increased.

Divisions and owns.—Sweden has en divided from remote nes into two great parts, 'ealand and Götaland, presenting the historical stinction between differ-t peoples and separated the great forests of veden, Tylöskogen, and olmården. The new uthern provinces were ined to Götaland in the venteenth century. Norrland, the third great division, contains all the stricts northwards from Gefle.

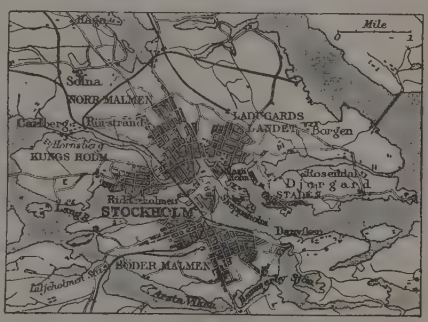


FIG. 100.—*The Site of Stockholm.*

In **Svealand** towns were first founded in the environs of the Mälar ake, and here the magnificent capital is situated at the short outlet of the ke. *Stockholm* is one of the most attractive towns of Europe. From the

original city on an island the modern town has extended widely on all sides. It contains a great palace facing the quays, which is the chief residence of the king. There are many old palaces and public buildings, such as the Riddarhus, the common property of the Swedish nobility, the Riddarholmskyrka, the burial-place of royal dynasties, several rich museums, the great royal library, a university college for natural science, a technical high school, a medical college, great hospitals, several academies and learned societies, a new opera-house, and several theatres. The different parts of the town are connected by numerous bridges. The old town is called Staden, with Södermalm and Norrmalm on both sides, and Östermalm, the newest and finest part. The beautiful park Djurgården, and several royal palaces, form attractions in the environs. Stockholm, with its fine harbour, is the first trading-place of Sweden in regard to imports, but comes after Göteborg and Malmö for exports. It is the chief industrial town in Sweden, with manufactures of every kind. Stockholm is defended on the seaward side by the very strong fortress of *Oscar Frederiksborg*. Northward lies the ancient town of *Upsala*, with a venerable cathedral and the oldest Swedish university, founded in 1477. *Falun* has great copper mines.

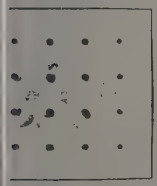
Farther north, in **Norrland,** the prosperity of which is steadily increasing, the towns occur principally on the coast, and *Gefle, Sundswall, Hernösand, Umeå, Luleå,* and *Haparanda* are some of the many small seaports exporting wood and ores. In the interior, which also includes Lappland, there is only one little town, *Östersund,* on the Storssjö lake, a station on the railway to Trondhjem. From Luleå a railway runs to the rich iron mines of Gellivara, and thence across to the Ofoten Fjord on the Atlantic in Norway.

Götaland, which includes the most fertile provinces, especially Östergötland and Scania, is rich in towns. The largest is *Göteborg* (*Gothenburg*) on the Skagerrak, at the outlet of the Götaelf, the first port for Swedish exports, and the centre for a great traffic along the coasts and on the canals. The town is regular and fine, with many splendid buildings, but is inferior to Stockholm in regard to picturesque situation. Göteborg has a well-endowed university college with a faculty of arts. On the coast of the Kattegat stands *Halmstad,* and on the Sound, *Helsingborg* and *Malmö,* two flourishing and advancing towns, with large exports from the province of Scania. This province, distinguished by its many fine country seats, also contains the inland town of *Lund,* with an old cathedral, and the second university of Sweden, founded in 1668. On the coast of the Baltic there is a long succession of more or less important towns, including *Carlskrona,* the chief station of the Swedish navy, with wharves and docks. In the interior of Götaland there are many small towns, including *Wexiö,* the bishops' seat in Småland, *Jönköping,* at the south end of Lake Vetter, and on the Motala river, the great manufacturing town of *Norrköping,* the chief industrial town of Sweden. The great

nufactories of *Motala* stand on the same river. On Lake Vener re are several towns, including *Venersborg* and *Lidköping;* and on the al where it enters Lake Vetter is the central fortress of *Carlsborg*. One the most interesting Swedish towns is the ancient *Visby*, on the island Gothland, in old times one of the first commercial places on the Baltic d a member of the Hanseatic League, but now remarkable for its splendid ns of churches and magnificent old walls. The population of the edish towns is 20 per cent. of that of the whole country. The peasants e mostly in farms, but in the south they also dwell in villages.

NORWAY

Government, People and Resources.—The native name of rway is *Norge* from *Norvegr*, which means the Northern Way. The King exercises his functions through a Ministry of State and at least seven Councillors or Ministers. The government is that of a democratic monarchy; the royal veto being limited to the extent that if a bill to which the royal assent has been refused is passed by three consecutive Storthings it becomes law. The legislature is in the hands of the Storthing (Parliament), elected by delegates who are chosen by universal suffrage. This assemblage has also exclusive power in finance.



. 101. — *Average population of a square mile of Norway.*

The people of Norway are to a great extent agriculturists, although the country cannot produce corn ough for its inhabitants, and needs a great import. A large percentage the people are seamen; the merchant fleet, only inferior in Europe to the tish, had a tonnage of 1,500,000 in 1901. Industry has long been at a y low level, but is now increasing, the country possessing great waterfalls, ich can supply power to the factories. In many parts of the kingdom re are rich mines, Kongsberg (silver), Eidsvold ld), Röros and Sulitelma (copper), being the t known. Most of the foreign trade is done h the United Kingdom, Germany, Sweden, and nmark. The fisheries of cod and herring are of at importance, especially those of Lofoten and marken. Along the coast and on the fjords, mmunication is kept up by steamers all the year nd, up to the Russian frontier on the Arctic Sea. eral lines of steamers connect Norway with the continent and the British nds. The roads are built by government engineers, many of them being rks of high technical skill. The railway system, also for the most part onging to government, is only complete in the south-east. Between ristiania and Trondhjem a line follows the valley of the Glommen.

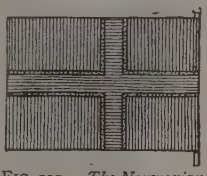


FIG. 102.—*The Norwegian Flag.*

Railways are now being constructed around the country, between Bergen and Christiania, and from Trondhjem towards the north. Three different lines connect Norway with Sweden. The great mail route is the southern railway *viâ* Göteborg to Copenhagen, by which the journey from London to Christiania may be made in less than sixty hours. The telegraph and telephone system has attained a high development, especially for the convenience of the fishing population in the remoter districts.

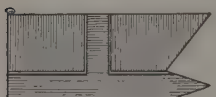


FIG. 103.—*Norwegian Naval Ensign.*

Education receives particular attention from the State and from local authorities, and is compulsory. The elementary and higher schools are well equipped. The army and navy were long neglected, but are now improved, and important fortification works have recently been carried out.

Divisions and Towns.—From old times Norway has been divided into two great divisions, the Nordenfjeldske and Söndenfjeldske or Northern and Southern Districts; the Vestenfjeldske or Western District has been formed later. The *Söndenfjeldske* includes the lowlands around Christiania Fjord and Lake Mjösen, together with the great central valleys. *Christiania* (sometimes spelt *Krstiania*), is the real centre of the country, situated at the northern end of the long Christiania Fjord, which forms a splendid harbour. The city is the capital of Norway, the seat of the Government and of the Storthing. It contains a university, founded in 1811, a learned society, several museums for science and arts, among them a museum of northern antiquities, the richest in objects from the Viking period. Christiania is the first commercial centre of Norway. The town is beautifully situated among wood-clad hills, but much of it is irregularly built. Many flourishing towns are situated along the coasts of Norway on the fjords and islands. Close to the Swedish frontier is *Frederikshald*, with the celebrated fortress of Frederiksten, and at the estuary of the river Glommen *Frederikstad*, one of the chief centres of the timber trade. *Drammen*, on the western side of Christiania Fjord, another centre of the export of timber. *Horten*, with *Carljohansvaern*, the chief station of the Norwegian navy; *Tönsberg*, the oldest town of Norway, and one of the head-quarters for Arctic sealing; *Christiansand*, and other busy seaport towns, stand on Christiania Fjord, or on the Skagerrak.

FIG. 104.—*The Site of Christiania.*

Stavanger, one of the oldest towns of Norway, stands on the Atlantic st at the south end of the great line of western islands. *Bergen*, ther north on the west coast, was once the first, and is now the second, n of the country, and from the oldest times it has been the chief place northern Europe for the fishing trade. In the fourteenth century Hanseatic League founded an establishment there, which remained four centuries. There are many remains from former times, including churches, the royal hall, and the tower of Bergenhus. It is now a rishing commercial town, with an intelligent and vivacious population; has a great museum and a biological station. *Christiansund* is an portant place for fishing. *Trondhjem*, one of the oldest towns (it was nded in 997), and now the third in importance, is the northern terminus the railways, with lines running south to Christiania and east to eden. The magnificent ancient cathedral is the coronation-place of kings of Norway. Next to Bergen, it is a centre for steamer trade, l in summer for the immense tourist traffic attracted by the smooth seas l romantic scenery of the fjords. In the far north, beyond the Arctic cle, there are several flourishing little wood-built towns, centres for ning in winter and for tourists in summer, including *Bodö*, *Tromsö*, and ır the North Cape, *Hammerfest*. Beyond the North Cape are *Vardö*, the ırdhouse of the first English Arctic explorers, and *Vadsö* on the Varanger ord in the extreme north-east.

The towns of Norway contain about 25 per cent. of the population the whole country. In the country the people live on their farms; .ages are unknown. It is an exception to find a town not situated on sea; the only inland towns are near mines, or on the shores of Lake ösen, among them the episcopal seat of *Hamar*. The rural population ntres round the four large cities, Christiania, Hamar, Bergen, and ondhjem; especially round the two former.

STATISTICS

NORWAY.

	1875.	1890.	1900.
Area of Norway in square miles	124,454	124,454	124,454
Population of Norway	1,813,424	2,000,917	2,239,880
Density of population per square mile ..	15	16	18

	1890.	1900.
Population of Christiania	151,239	227,626
" " Bergen	53,684	72,251
" " Trondhjem	25,065	38,180
" " Stavanger	23,899	30,613

ANNUAL TRADE OF NORWAY (*in pounds sterling*).

	1871–75.	1881–85.	1891–95.
Imports	6,300,000	8,100,000	11,900,000
Exports	4,880,000	5,700,000	7,000,000

SWEDEN.

	1880.	1890.	1900.
Area of Sweden in square miles	170,722 ..	170,722 ..	170,722
Population of Sweden	4,565,668 ..	4,774,409 ..	5,136,440
Density of population per square mile ..	26 ..	28 ..	30
Population of Stockholm	168,706 ..	246,454 ..	300,624
" " Göteborg	76,500 ..	104,657 ..	130,619
" " Malmö	38,082 ..	48,504 ..	60,857
" " Norrköping	26,924 ..	32,826 ..	41,008
" " Gefle	18,749 ..	23,484 ..	29,522

ANNUAL TRADE OF SWEDEN (*in pounds sterling*).

	1871–75.	1881–85.	1891–95.
Imports	12,400,000	17,700,000	19,500,000
Exports	10,700,000	13,500,000	17,700,000

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G. Sundbärg (Editor). "Sweden, its People and its Industry." Stockholm, 1904.
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J. Fr. Nyström. "Handbok i Sveriges geografi." Stockholm, 1895.
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II.—DENMARK

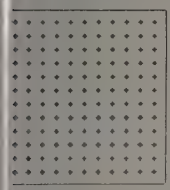
By the Editor.

Position and Coasts.—The name Denmark is properly *Danmark*, the mark, marches or frontier of the Danes. Jutland (in Danish *Fyland*), the northern portion of the Cimbrian Peninsula occupied by Denmark, lies between the same parallels of latitude as Scotland south of Inverness. The western shore facing the North Sea is low, sandy and unindented, but behind the sandy beaches and lines of dunes there are several large lagoons. A long, narrow, curved sand-spit called the Skaw or Skagen, forms the tip of the peninsula. The east coast is somewhat higher and more indented; a number of its inlets form safe harbours for small vessels. The two largest islands of Denmark stretch between the south of Jutland and the south of Sweden, separated by the shallow and tortuous *Little Belt* between Jutland and Fünen, the wider and deeper *Great Belt* between Fünen and Zealand, both leading into Kiel Bay, and the *Sound* between Zealand and Sweden. The historic greatness of Denmark depended on the command of these channels, and the importance of having them in the possession of a neutral Power in case of war has probably preserved this small kingdom from absorption in any of its larger neighbours.

Surface and Resources.—The west and north of Jutland consist of heather-covered moorland which yields peat for fuel. The south-east and the islands, being traversed by the western extremity of the Baltic coast-ridge, are hilly, and full of variety of landscape, although the highest summit is less than 600 feet above the sea. No coal or metallic ores occur in the country; the soil is everywhere underlain by recent rocks. The hills and vales of Denmark were originally thickly covered with beech

est, and although most of the land is now cleared for pasture and the owth of oats, barley and, rye, extensive woods still remain. The climate embles that of eastern Scotland, but is a few degrees colder in nter and warmer in summer. It is, however, less extreme than the nate of central Germany. Although the Sound and other channels often blocked with drifting ice in winter, they are rarely closed to vigation for any time.

People and History.—The early Cimbrian race were succeeded by Teutonic tribes, who from Jutland and other parts of the Baltic and North Sea shores descended upon the coast of England, forming the English people. The Scandinavian Danes from the Baltic Islands then obtained a footing on the peninsula, and the power of their kings extended over Norway, the south of Sweden, and England. Denmark has remained free of foreign control, but in the seventeenth century it lost the last of its territory in Sweden, and in 1814 Norway was separated from the Danish crown. The German-speaking people of the duchy of Holstein, in the south, who had, ring previous centuries, sometimes been subject to the King of nmark, at other times to the German Emperor, became dissatisfied; l in 1864, after a war between Denmark and Prussia, the duchies Schleswig (Slesvig) and Holstein were incorporated with the kingdom Prussia.



105.—*Average population of a square mile of Denmark.*

The Danes have always been enterprising and persevering in war l commerce, winning for themselves colonies in Greenland, Africa, l the West Indies, but the tropical possessions are now reduced to three small islands of St. Thomas, St. John, l St. Croix, while Iceland is a separate country nowledging the Danish crown. At home more n half the people make their living by agriture, the rest by manufactures, by trade, fishing, l as sailors, many of them serving on British l other foreign ships. The form of government Denmark is a limited monarchy, with a parliant of two houses, both elected by the people. ctically every man has a vote. The Lutheran Church is established by , and education has long been universal. The land is divided up into a at number of small farms. Butter-making is the greatest industry of country, being carried on by scientific methods, and butter forms more n half the value of the exports. There are few manufactures. Textile rics, metals, and coal are the principal imports. Most of the foreign de is done with the United Kingdom, which takes more than half the orts, and Germany, which sends about one-third of the imports. The

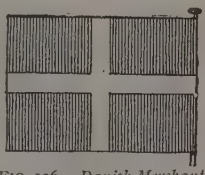


FIG. 106.—*Danish Merchant Service Flag.*

railway system is very complete, the trains being ferried across arms of the sea in steamers, and most of the lines belong to the State.

The Islands of Denmark.—Zealand (or Secland), with the detached portions forming the picturesque islands of Laaland, Falster, and Moën to the south, form the eastern division of Denmark, flanked on the east by Sweden, and on the south by Germany; its indented coasts are deeply penetrated by the water of the Kattegat and the Baltic. *Helsingör* (Elsinore) will be remembered as the scene of Shakespeare's "Hamlet," and from the reference of Campbell in his description of the battle of the Baltic, but both descriptions are geographically at fault, the shores are low, and the castle stands at the level of the sea.

Copenhagen (*Kjöbenhavn*=Merchant's harbour), the one large town of Denmark, is situated near the widest part of the Sound where the island of Amager helps to form an excellent harbour. It is strongly fortified by a series of modern batteries occupying artificial islets, hardly showing above the water. The town is handsomely laid out, with gardens and fine public buildings; it is the seat of government, the residence of the king, and contains a university and several learned societies. Copenhagen concentrates the maritime trade of Denmark, as no other harbour can receive large vessels. *Korsör*, at the south-west of Zealand, and *Gjedeser*, at the south of Falster, are steamer ports for the express routes to Kiel and Warnemünde (for Berlin). The richly cultivated island of Fünen (or Fyen), with Langeland and a maze of smaller islands to the south, forms the western shore of the Great Belt, which is crossed by ferry-steamers to *Nyborg*, whence a railway passes through the ancient town of *Odense* to *Strüb* on the Little Belt.

FIG. 107.—*Railway and Steamer routes in Denmark.*

Jutland.—Jutland, though nearly twice as large as the islands, contains rather fewer inhabitants. Almost all the harbours lie on the Kattegat coast, and the southern and eastern parts of the peninsula are the most thickly peopled because agriculture is the mainstay of the people. *Aalborg*, on the narrowest part of the Liim Fjord, where it can be crossed by a railway bridge, and reached by small vessels from the Kattegat, is the chief commercial centre of the north. At *Thisted*, on the wide lagoon of the Liim Fjord in the west, Malte-Brun, the author of a celebrated French treatise on geography, was born. *Aarhuus*, on the east coast, is the largest town of Jutland, with a busy harbour. Further south

sens, Veile, and *Kolding,* stand each at the head of a short fjord in heart of beech forests. *Fredericia* is the railway harbour for Strüb ünen, on the route to Copenhagen which has the shortest sea passage. *erg* on the North Sea is an important and growing port.

Bornholm.—When the southern provinces of Sweden were given up Denmark, the rocky island of Bornholm in the Baltic was also ceded ; the people of the island massacred the Swedish troops who came to possession, and the island has remained part of Denmark. The lofty s of granite and ancient sedimentary rocks are entirely different from rocks of Denmark, and the island yields building stone and even a coal. The principal town is *Rönne.* The chief value of Bornholm a lighthouse station.

The Faroes (*i.e.,* sheep islands) form a group of twenty-two small ds situated nearly mid-way between Shetland and Iceland on the great narine ridge that runs from Scotland to Greenland. They are com- d of volcanic rocks, in large part of horizontally bedded basalt, which appear to have formed a plateau of great extent. This ancient au had been deeply cut into by river-valleys running parallel to other from north-west to south-east, and by subsequent subsidence valleys became fjords or sounds, cutting up the land into a succes- of long narrow islands or peninsulas. The climate is very equable, the people make their living by sheep farming, the capture of birds, chiefly loons, and fishing. They are of Norwegian descent, and k an old Norse dialect, although Danish is the official language. one town is *Thorshavn,* on the east coast of Stromö, the largest d ; a little place of wooden houses, frequented in summer by ng vessels.

STATISTICS.

	1880.		1890.		1900.
Area of Denmark (square miles)	15,280	..	15,289	..	15,289
Population of Denmark	1,980,259	..	2,185 335	..	2,449,540
Density of population per square mile ..	129	..	143	..	160
Population of Copenhagen (without suburbs)	235.254	..	312.859	..	378,223
„ Aarhuus	24,831	..	33.308	..	51,814
„ Odense	20,804	..	30,277	..	40,138
„ Aalborg	14,152	..	19,505	..	31,457

ANNUAL TRADE OF DENMARK (*in pounds sterling*).

	Average 1871–75.		1881–85.		1891–95.
Imports	6,000,000	..	14,000,000	..	18,800,000
Exports	4,700,000	..	10,000,000	..	14,100,000

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H. Weitemayer. "Dänemark, Geschichte und Beschreibung," and English translation. London, 1891.

III.—ICELAND

By Dr. Thorvald Thoroddsen,[1]

Position and Surface.—Iceland is a large island in the North Atlantic Ocean on the edge of the temperate zone. The arctic circle touches the most northerly points, and the south of the island lies in 63½° N. Many fjords cut their way into the steep coast on the west, north, and east; but the south coast is without indentations, and close to the sea is very low and sandy. The largest bays are in the west—Faxaflói and Breidafjördur, and north of the latter a nearly isolated

FIG. 108.—*Iceland*

peninsula, intersected by many fjords, stretches to the north-west. Iceland is mainly composed of volcanic highlands, with an average height of about 2,000 feet; lowlands are only found in the south and south-west, and form only one-fourteenth of the whole area. They are all produced by river deposits silting up the heads of bays or fjords. The highlands bear several large snowfields, of which Vatnajökull is the largest, all producing glaciers which give rise to large rivers. The snow-level is lowest (1,300 feet) in the north-west, and highest (3,500 to 4,000 feet) in the centre.

[1] Translated from the Danish by Fru Backer-Lund.

highest parts of the country are in the south-east, the highest point ıe southern ridge of Vatnajökull being Öræfajökull, which reaches feet. Most of the Icelandic rivers are short, but full of water, flow- strongly and broken by many waterfalls. The longest rivers (80 to miles) are the Thórsá, Olfusá, and Jökulsá in Axarfjord, the last with mposing waterfall of Dettifoss. There are several lakes, the best n being Thingvallavatn.

eology.—Iceland is built up of volcanic masses of Tertiary age; hirds of the country consists of basalt in horizontal beds of gentle vith steep escarpments and cliffs falling to the sea, exactly as in the es. Right across the country there runs a belt of tuff and breccia, pying about one-third of its area. There are more than 100 volcanoes, hich 25 have been in eruption during historical times. Some have same conical form as Vesuvius; others are broad and of very e slope, like Mauna Loa in the Sandwich Islands; but most of the tions have come from fissures on which a long row of low craters been formed. These volcanoes have produced large lava fields, h together cover an area of about 4,000 square miles. The best n volcanoes are Hekla, Katla, and Askja, the crater of which covers ea of 16 square miles. Katla is, like several other Icelandic volcanoes, red with glaciers, which during the eruptions melt and cause dreadful lations. Earthquakes are very common, and have often done great y both to life and property. There are many hot intermittent springs, hich the Geysir is most famous, and its name is often applied to such gs as a general term.

limate and Productions.—Iceland has an insular climate, which ıch warmer than the latitude would suggest. In the south the winter ld and the summer proportionally temperate; the mean temperature ıe year in Eyarbakki, in the south, is 38·5° F., and for Akureyri, ıe north, 36° F. The climate is rather wet and very stormy; but does not lie long on the coast in winter, and many harbours in west are never frozen. The highlands are very cold, and snowstorms common even in summer. In the north of the island the climate is cold, with a greater range between winter and summer. Floating ice Greenland often blocks the north coast, stopping the shipping trade the fisheries, and affecting the climate adversely. The vegetation has uropean-Arctic character; here and there small woods of stunted h and a very few mountain-ash trees occur. The natural pastures are llent, and sheep thrive well; rich grass fields always surround the s, and the hay yielded by them is used for the cattle. There is other agriculture, even barley rarely ripens. Foxes are the most mon animals, and polar bears sometimes come with the floating

The sea abounds with all sorts of fish, of which cod, herring, flounders are amongst the most important; and whales and seals lso plentiful. The coast is crowded with sea-birds; the eider-duck is

of great importance to the inhabitants, and is tended almost like a domestic animal.

History.—Iceland was first discovered by Irish monks about the year 790. It was next visited by Norwegian vikings in 870, and was colonised from Norway in the years 874 to 930. An Icelandic republic was then established with an aristocratic form of government, which lasted till 1262, when the country entered into a personal union with the kingdom of Norway. That was the golden age of Icelandic culture, and it is memorable for the splendid poetic and historical literature contained in the Edda and Sagas. The early Icelanders were daring sailors. They colonised Greenland in 982, and discovered America in 1000. After the year 1262 the prosperity of the country declined, mainly because of successive misfortunes, volcanic eruptions, plague, and bad government; and practically it is only since 1874 that it has begun to recover; but now there is progress in all directions. Together with Norway, Iceland in the year 1389 came under Denmark, and it has since belonged to the Danish crown. In 1874 a separate free constitution was granted, with a legislative assembly (Althing), a Governor-General (Landshöfding) in Reykjavik, and an Icelandic ministry in Copenhagen.

People.—Only the lowlands, the coast, and the valleys are inhabited. The great highland area cannot support any inhabitants, for except a little grass on its outer slopes it consists only of bare ground, lava deserts, and snowfields. Trade was in olden times carried on by Icelanders and Norwegians. In the fifteenth century English sailors took a large share, and in the sixteenth German influence preponderated. From 1602 to 1787 there was a Danish government monopoly; in 1785 trade was thrown open to all Danish subjects, and in 1854 to all nations. At present the trade both with Great Britain and Denmark is chiefly carried on by Icelanders. The chief exports are fish, cod-liver oil, salmon, sheep and horses, salted mutton, wool, fur, eider-down, and feathers. There is no manufacturing industry. Most of the inhabitants live by breeding cattle, especially sheep; a smaller number by fishing, with much risk to life, in open boats. On the great fishing banks French and British fishing-vessels of larger size are at work, while the Norwegians carry on whale hunting from stations on the coast. Many horses have to be kept because they furnish the only means of transport in the country, and the only roads in most places are bridle paths. Recently, however, good roads for driving have been commenced, and bridges are now being built over the rivers.

The Icelanders still talk old Norwegian (the Saga language) almost unchanged, and every child can read the ancient Sagas. There is a good deal of current literature, and more books and newspapers are published per head of the population than in any other country. Education is universal and thorough. Nearly all the people belong to the Lutheran Church.

Postal communication with abroad is by steamers from Copenhagen calling at Leith in Scotland, and the Faroes. In summer there is also

ar steamer service all round the coast. A telegraph cable connects
id through the Faeroes with Scotland. *Reykjavik*, the capital, and the
town, is built on a little projecting point in the south-eastern part of
flói. Here the Althing is held, and the Governor-General and the
)p of Iceland reside. Reykjavik has classes for medicine, theology,
cal languages, and navigation, and there is a national library, a collec-
)f antiquities, and a national bank. In the centre of the town there is
:ue of the famous sculptor, Albert Thorwaldsen, who was of Icelandic
1.

STATISTICS.

Area of Iceland (square miles)	30,432
Area of habitable portion (square miles)	6,784

	1880.	1890.	1895.
Population of Iceland	72,445	70,927 [1]	73,449
„ „ Reykjavik	2,567	3,886	4,222

ANNUAL TRADE OF ICELAND (*in pounds sterling*).

	Average 1881–85.	1891–95.
Imports	340,000	356,000
Exports	310,000	340,000

STANDARD BOOKS.

Th. Thoroddsen. "Geschichte des Isländischen Geographie. Uebersetzt von A. Gebhardt." Vols. i. ii. Leipzig, 1897, 1898.
J. Coles. "Summer Travelling in Iceland." London, 1882.
W. Bisiker. "Across Iceland." London, 1902.

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1 From 1880 to 1890 there was a great emigration to America, chiefly to Manitoba, but this has now almost ceased.

CHAPTER XIV.—THE LOW COUNTRIES

I.—THE NETHERLANDS

By Dr. C. M. Kan,[1]

Professor of Geography at the University of Amsterdam.

Position and Geology.—Although one of the smallest countries Europe, the kingdom of the Netherlands (*Nederland*=low country), Holland (so called from its most important province, Holland, deriv from *Houtland, i.e.*, Woodland), is one of the most noteworthy. It l between 50° 45′ and 53° 32′ N. latitude, and between 3° 25′ and 7°-12′ longitude, on the north-west coast of central Europe, at the mouths of t Scheldt, Maas (Meuse), and Rhine. Its importance results from its po tion, its commerce, and its colonies.

Traces of Coal Measures, Chalk, and Tertiary sands and loams cover l than 1 per cent. of the area, and appear only in the extreme east a south-east, while the most recent Quaternary formations, diluvium a alluvium, occupy respectively 40 and 59 per cent. of the surface. the south the Maas and the Rhine have co-operated in the formati of the diluvium ; and in the north the inland glaciers of the Ice Age. their period of enhanced activity consequent on the Great Ice Age, t Maas and Rhine brought down coarse sand and grit ; but at a later ti principally finer sand. The diluvium of the northern provinces, being Scandinavian origin, contains coarse gravel and loam, in addition to t sand ; it also lies higher, its surface is less flat, and forms more distincti watersheds between the rivers of that part of the country. Vegetatic rivers, the sea and wind have combined in the formation of the alluv strata. Plant remains have given origin to the fens and arable lands, a contributed to the formation of the iron-ore, found in the badly drain parts of the smaller river basins in the east, and the loess which occurs the south of Limburg only. The high fens, which consist of heat cotton-grass, rushes, moss, and sometimes trees, only occur upon the high sandy soils ; they are found principally in the south and east of the countr and lie above the ordinary level of the water. The low fens in the nor and west owe their origin largely to marsh plants, and frequently rest up clay of high fertility. In process of time the sandbanks deposited in t sea develop into sand-spits ; then the sea builds up chains of marine dun upon them, shutting off a haff or lagoon against the land. It is in su

[1] Translated from the Dutch by J. T. Bealby.

ons that the greater number of the low fens have been formed. most recent deposits of fluvial clays stretch chiefly east and west g the Rhine, the Waal, and the Maas, occurring more especially een the diluvial regions of the north and those of the south of the try. In the west recent marine clays have been deposited along the

FIG. 109.—*The Netherlands, showing height of land.*

e of the diluvial strata. Wind has played ctive part in the formation of the sand- es, which still occupy extensive areas in Veluwe, in Drenthe, and in North Brabant.

Reclamation of Land. -Human energy has materially supple- nted the operations of natural forces by draining the marshes and ching the fens, by fighting against the drifting sand, protecting the sts with dunes and dykes, regulating the rivers and carrying out other ks. Polders are low-lying inland tracts protected by means of dykes and nds against the invasion of water from the higher land around them,

the superfluous water being at the same time pumped out and led away. By embanking the lands along the sea shore which are not sufficiently high, they are wrested from the dominion of the ocean, protected by dykes or banks, and gradually transformed into the most fertile districts. Thus the land that has been destroyed by the sea, which in 1894 amounted to a larger area than the united provinces of North Brabant and Limburg, is being to some extent made up for by reconquests of better land.

Configuration.—The lowest-lying part of the Netherlands is on the west, bordering the sea (Fig. 109). With the exception of the narrow strip of sea-dunes, which have a mean height of 30 feet, nearly a quarter of the surface of the country lies between sea-level and 8 feet below, while about half as much lies between sea-level and 3 feet above; in other words, 38 per cent. of the surface would be overflowed by the ocean were it not protected by dunes and dykes. Some of the lower-lying tracts, consisting exclusively of reclaimed fens and marshes, are actually from 5 to 15 feet below sea-level. The remaining 62 per cent. of the surface on the whole forms a series of belts or zones stretching from south-west to north-east. In Drenthe, Gelderland, Overysel, Utrecht, and Limburg there are hills of gravel and sand ranging from 150 to over 300 feet in elevation; and in the south-east of Limburg the region of the old rocks, the highest elevation of the kingdom attains an altitude of 1055 feet. Small as these altitudes may appear they have produced their effect upon the flow of the rivers, drainage, the fertility of the soil, the climate, and even on the construction of roads and railways. The differences of level and relief themselves are largely due to the action of the glaciers of the Great Ice Age and their moraines.

Rivers and Canals.—From the higher-lying diluvial tracts and gravel hills of Drenthe and Groningen a number of small streams radiate through diluvial valleys into the adjacent provinces; and many short streams also flow westward from the east of Overysel and Gelderland. Elsewhere the minor streams make their way into the channels deserted by the larger rivers—for instance, the Eem and the Ysel, and in the south the Aa, Dommel, and Mark. The larger rivers do not follow the natural inclination of the diluvium, but flow in the direction of the general slope of the country, or from south-east to north-west. The east to west direction of the Rhine, Waal, and Lek is the most influential factor in determining their economic importance, since it makes them the chief natural highways between central Germany and the sea. Four-fifths of the river trade of Holland is carried by the Rhine and the Waal, these rivers being international waterways.

The most important canals, from 12 to 25 feet deep, are the North Sea Ship Canal, connecting Amsterdam and the sea (Fig. 112); the Rotterdam Waterway, giving that city easier access to the North Sea; the Canal of South Beveland connecting with the Scheldt; the Merwede Canal and the King William Navigation, uniting various rivers with one another; and the canals which terminate at the Helder and the Dollart. Minor canals

e for the transport of turf, and for communication between towns. :erdam, Amsterdam, and Flushing have a trade of nearly nine million between them, as compared with scarcely more than two million tons ıll the ports not situated on the deep rivers or ship canals.

Coast.—The characteristic features of the western coast are sand-ks, mud-flats, high dykes (embankments), and sand-dunes, with a low, gently sloping shore. Further north a series of low islands marks former coast line ; indeed some of them still possess dunes. The sandy lows are covered with water by the tides, otherwise they would be cut from direct communication with the existing coast and the Zuider Zee.

Natural Productions, Flora and Fauna.—Mineral products are ted to a very little coal from the mines of Limburg, bricks from the ine and fluvial clays, sandstone from quarries near Maastricht and else-re, and some bog-iron ore. Both the diluvial and alluvial lands are ɔted for agriculture and grazing ; these occupations utilise respectively nd 35 per cent. of the total area ; 7 per cent. is planted with forest, and ıt 20 per cent. is waste. The vegetable products of the sandy soils are cipally rye, buckwheat, and potatoes, and thus differ from the chief lucts of the fluvial and marine clays—hops, rape-seed, sugar-beets, .cco, and wheat. Orchards, market-gardens, and the characteristic ch industry of flower-gardening, occupying together 1½ per cent. of the ıtry, are found principally on the *geest* or higher grounds along the e of the marshes on the sandy soil, and in the reclaimed lands of the :. The different character of the soil in different parts occasions ations in the breed of horses, oxen, and sheep ; but does not affect the :s and swine to the same extent.

Climate.—The climate of the Netherlands is determined by the tion of the country between 50° and 53° N. latitude, by its situation on eastern shore of the North Sea, and by its low elevation. The mean of :ly fifty years' observations at Utrecht gives an annual temperature of F., with a mean of 49° for the spring and autumn months, 66° for summer, 34·5° for winter. Owing to the proximity of the sea, the winters are cold, nor the summers unpleasantly warm. The water of the North , which, as observed on the North Helder sandbank, has a January mean perature of 46° F., and a July mean of 60° F., is also an influencing or. The average annual rainfall amounts to 28 inches ; rain falls on days in the year on an average, snow on 19, and thunderstorms occur 18. The wind blows from the sea from directions between south-west north for 219 days in the year on the average ; and from the land, n directions between north-east and south, for 146. The greatest ntity of rain falls upon and behind the maritime dunes. But the east ers most from the west in the smaller degree of its moisture and poration, both very important factors in the polders or reclaimed lands. ere the people suffer considerably from the drawbacks of the climate, ecially its variability, and the prevalence of diseases affected by it.

Consequently in the western lowlands the death-rate is relatively highest —30 to 40 per 1,000, as compared with 20 to 30 per 1,000 in other parts of the kingdom.

People and History.—The people of the Netherlands trace their origin to three Teutonic races the *Frisians*, who now preponderate in the west and north-west, and are best represented in the province of Friesland; the *Saxons*, in the east and north-east as far as the Ysel and Rhine; and the *Franks*, in the south, extending northwards a little beyond the Rhine. The three types differ in dialect, in the plan of the villages, styles of the houses, racial character, dress and customs. The fact that the Frisians inhabit chiefly the clay soils and low fens, the Saxons the diluvial tracts of the east, and the Franks the river-clays and diluvium of the south, has helped to maintain these differences. The races are now welded together into one people by the possession of a common written language, *Dutch* (neither "Hollandsch" nor Low German), and in cultured circles a common spoken language also. After Dutch the most important language of the Netherlands is Frisian, which possesses a separate literature, but is not officially recognised.

After the Roman supremacy came to an end the country was subdivided into various counties, duchies and bishoprics, which were reunited under the rule of the Dukes of Burgundy; separated from the German Empire, and enjoyed autonomy under Charles V. (1548). The Eighty Years' War of Independence against Spain followed; and after a lapse of time the country developed into a commercial and colonising State under the Statholders of the House of Orange-Nassau, its complete independence as a free republic was recognised at the Peace of Munster in 1648. The civil liberty and religious toleration which the Dutch so jealously guarded attracted large numbers of strangers—Flemings, Walloons, Huguenots, and Germans, who paid for the hospitality extended to them by fostering the commerce, and especially the industry of the Netherlands. After the abolition of the republic and the establishment of the sovereignty of the House of Orange the year 1848 marked a fresh era in the political life of the nation by introducing a new and more liberal constitution, initiating reforms in economic and social matters, and developing the colonies to a high pitch of prosperity.

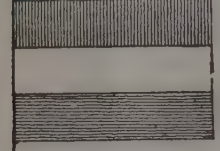

FIG. 110.—*Flag of the Netherlands.*

Government.—According to the constitution of 1848, the Netherlands forms a hereditary limited monarchy. The legislative power is shared by the Crown and the States-General, which includes a First Chamber of thirty members, and a second chamber of a hundred members. The executive powers of the Crown are delegated to eight responsible Ministers, and a Council of State of fourteen members. For administrative purposes the country is divided into eleven provinces and 1,123 communes; the former

erned by the Provincial States and a Royal Commissioner, the latter he communal council and magistrates with a burgomaster or mayor.

Occupations.—Fully one-third of the productive workers are occu- l in agriculture, the breeding of cattle, gardening, and so forth ; about same number in manufacturing industry and trade ; one-sixth in com- ce, on railways and other means of communication ; and a much smaller portion in fishing. Agriculture on the clay soils, the sandy soils, and in fens differs not only in its staple products but also in the methods of ivation employed. Large estates are rare, and those which exist are fly confined to the clay soils. Tenant farmers preponderate in the vinces of Utrecht, Friesland, South Holland and Zealand ; in the other vinces peasant proprietors. After agriculture in order come the textile ustries, principally developed in Overysel and North Brabant ; the king of metals for ship-building and agricultural implements ; the ufacture of paper and leather ; of chemical products, sugar, spirits and l materials, especially butter and cheese. More than three-quarters of factories belong to the provinces, Overysel, North bant, North and South Holland.

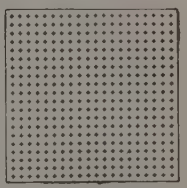

FIG. 111.—*Average population of a square mile of the Netherlands.*

Trade.—The products of agriculture and stock- eding, and of such manufactures as margarine, ar, textiles, iron-ware, quinine, constitute the more ortant articles of commerce. The trade of Holland iefly carried on with Germany, the United King- n, Belgium, Java and Russia. These countries send he Netherlands about 90 per cent. of the total orts, and take about 75 per cent. of the total ex- s. Very many of the trading steamers sail under ign flags, chiefly British, German, and Norwegian. Trade and commerce, both foreign and inland, are greatly facilitated by etwork of nearly 9,500 miles of roads and dykes practicable for vehicles, about 7,000 miles of tramways, mostly worked by steam, and ap- ximately 2,000 miles of railways, which are connected with the systems ne adjacent countries at several points in the east and south.

Fishing is prosecuted principally in the North Sea ; but a large number ishermen work in the Zuider Zee, in the rivers of South Holland and land, and off the coasts of Groningen and Friesland.

Density of Population.—The density of the population varies n the means of subsistence and the degree of concentration in e cities, the range amongst the provinces being from 127 to 816 square mile. But here the determining factor is the fundamental racter of the soil. When the kingdom is mapped according to soils, it appears that the higher gravel lands of Groningen and nthe, the sandy tracts and unreclaimed fens of North Brabant, and regions of the dunes and sand-drifts, all show a density of population than 65 per square mile ; the lower-lying diluvium of Scandi-

navian origin, the intermediate diluviums of Overysel and Gelderland, the low fen pastures, the tracts adjacent to the sea-dunes on the islands of South Holland and Zealand, have a density of 65 to 125 per square mile ; the non-diluvial tracts in the interior of Groningen and Friesland, in the south-west of Drenthe, in the east of Overysel, and the diluvium of Limburg have from 125 to 250 per square mile ; a few settlements in Groningen, the valley of the Ysel, the fluvial clays of the Maas, Waal and Linge, the industrial regions of Brabant and Limburg, the reclaimed polders and certain of the marine clay districts—all exceed 250 per square mile ; and finally, in the neighbourhood of Maastricht and of Eindhoven, the banks of the Noord and Maas, the vicinity of the large towns of North and South Holland, the density exceeds 500 and in some places even 1,000 per square mile.

The Large Towns.—The size of the towns and their importance depend upon the same conditions as the density of population. The kingdom contains twenty-one towns, each possessing a population of more than 20,000, and at least one of these is found in each of the five sub-divisions just enumerated ; the larger towns being more frequent on the richer soils. The chief towns in the north-east are *Groningen*, a market for agricultural products, a shipping centre, seat of a university, and provincial capital ; *Leeuwarden*, the capital of Friesland, and an important cattle-market for the trade with England *viâ Harlingen ; Zwolle* and *Deventer*, the chief live-stock and corn markets of Overysel. These towns possess but little industry. *Arnhem* and *Nijmegen*, the principal towns on the fluvial clay soils, attract many inhabitants by reason of their picturesque surroundings, their active river trade, and their important markets. In the south of the kingdom are the fertile districts and manufacturing centres of *Breda*, *Tilburg*, *s'Hertogenbosch* (*Bois-le-Duc*) in North Brabant and *Maastricht* in Limburg. The last two are also provincial capitals. The most important city in the centre of the kingdom is *Utrecht*, on soil intermediate between the pure clays and the pure sands ; it is a provincial capital, seat of a university, and an important railway junction. *The Helder*, in North Holland, stands at the entrance of the North Holland Canal, and possesses several naval institutions. In the same province are *Haarlem*, capital of the province, and busy with the cultivation of flower-bulbs, and *Amsterdam*, the largest town, and one of the two chief commercial centres, famous for its Exchange and money market, its shipping, manufactures, diamond-cutting, and for its university and museums. The western parts of the province of South Holland are the most densely

FIG. 112.—*Amsterdam, showing polders in its vicinity.*

oled districts in the kingdom. There are the towns of *The Hague ravenhage*), the capital of the kingdom and seat of the chief artistic stries; *Delft*, a cheese and butter market, with manufactures of fine ery, and of spirits; *Dordrecht*, with active river-shipping and trade in er, corn and wine; *Leiden*, the seat of an ancient university, with a ishing market, and a still considerable manufacture of cloth and cotton; edam, best known for its spirit distilleries producing gin or *Hollands*, also important as a corn-market; and *Rotterdam*, one of the most ous seaports and commercial centres on the Continent, though the of its commercial activity is in connection with transit trade.

STATISTICS.

	1879.	1889.	1899.
Area of the Netherlands (square miles)	12,728	12,728	12,728
Population of the Netherlands	4,012,693	4,511,415	5,104,137
Density of population per square mile	316	353	401
Population of Amsterdam		399,424	520,602
„ Rotterdam		197,722	332,185
„ The Hague		153,340	212,211
„ Utrecht		83,304	104,194
„ Groningen		56,038	67,563
„ Haarlem		50,500	65,189
„ Arnhem		49,727	57,498

THE DUTCH POSSESSIONS ABOUT 1897.

	Area sq. mls.	Population.
The Netherlands	12,728	5,104,137
Java	50,554	26,125,053
Other Islands of Dutch East Indies[1]	685,846	7,964,947
Dutch Guiana[2]	46,060	67,128
Dutch West Indies	403	51,693
Total	795,591[1]	39,312,958

ANNUAL TRADE OF THE NETHERLANDS (*in pounds sterling*).

	1872–76	1882–86	1892–96
Imports	56,750,000	89,750,000	120,500,000
Exports	43,000,000	68,500,000	98,000,000

STANDARD BOOKS.

"Algemeene Statistiek van Nederland." Leiden. (Published by the Dutch Government Statistical Society), 1870-onwards.
H. Blink. "Tegenwoordige Staat van Nederland." Amsterdam, 1895-96.
R. Schuiling. "Aardrijkskunde van Nederland." Zwolle, 1897.

II.—BELGIUM

By J. du Fief,[2]

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Position and Configuration.—Belgium (*La Belgique*) is situated tween 49½° and 51½° N., that is to say, between the parallels of the island Guernsey and of London. It is bordered on the west by the North Sea ich separates it from England, on all other sides there are land frontiers; vards the Netherlands on the north, Germany and the grand duchy of

[1] Estimates. [2] Translated from the French by the Editor

Luxemburg on the east, and France on the south. The short sea-coast, extending for only 42 miles, is washed by a sea so shallow that the depth does not exceed five fathoms until at least five miles from the shore. The shore itself is entirely composed of sand, very low and uniform, but suitable for the establishment of seaside watering-places; it is separated by a line of dunes from the low plain of the interior. From the dunes the land rises gradually towards the south-east, but to the north the surface is absolutely flat throughout the greater part of the provinces of Flanders, Antwerp, and Limburg. In the centre nearly parallel undulations of the ground separate the tributaries of the Schelde; and the surface exceeds 600 feet in elevation at a few points along the left bank of the Sambre and Meuse (Maas). South-east of the line formed by these two rivers the land becomes more broken and picturesque, rising to the high plateau of the Ardennes with a maximum elevation of 2,230 feet, and sinking again on the southern frontier to about 1,000 feet above the sea.

Geology.—Geologically the northern half of Belgium is covered by Quaternary deposits, including the marine and fluvial alluvium of the polders, the sand of the Campine, and the mud of Hesbaye. These are followed by Tertiary formations which extend across the whole breadth of the country as far south as the Sambre and the Meuse, containing the yellow sand of the province of Antwerp, the clay of the Rupel valley, which is of value for brickmaking, and the argillaceous sands and coarse limestones of Mons. Secondary strata are chiefly represented by the Cretaceous rocks which are utilised in the valley of the Haine, fire-clay of a refractory character capable of withstanding a very high temperature, white chalk and a brown phosphatic chalk, and marl and chalk in the valley of the Geer, a tributary of the Meuse. Primary rocks crop out at a few points in Hainaut and Brabant, and cover the greater part of the Ardennes in the provinces of Namur, Liége, and Luxemburg. These strata yield limestones of value both for building purposes and for making lime, sandstones useful for paving, slates, and, most important of all, great deposits of coal which underlie the whole south of Belgium, from west to east, and give rise to rich coal-fields at Mons, Charleroi, and Liége.

Rivers and Canals.—Belgium is traversed from south to north by two great rivers which enter the country from France and pass on into Holland where they reach the North Sea. The *Meuse* (Flemish *Maas*) which traverses the picturesque part of the country in the east, flows through the fine valley in which stand the towns of Dinant, Namur, Huy, Seraing, and Liége. Beyond this it serves as the boundary between Belgium and Holland. It has been canalised as far as Visé, close to the German frontier, to render it fully navigable. Its tributaries on the right are picturesque but unnavigable mountain streams; the lower course of the Ourthe which flows in at Liége has however been canalised. The *Schelde* (French *Escaut*) traverses the low and level country of western Belgium, and the towns of Tournay, Oudenard, Ghent, Termonde, and Antwerp have grown upon its

s. It is regulated by locks as far as Ghent, below which it flows
y to the sea. The chief right bank tributaries are the Dendre which is
ised, and the Rupel, formed by the junction of the Dyle and the
e; and on the left bank the Lys which is canalised. A small coast
. the Yser, which also comes from France, passes Nieuport and flows
he North Sea. Two canals keep up communication between Ghent
the sea, one running to Bruges and Ostend, the other due north to
euzen; and a large ship canal is now in construction going direct
Bruges to the sea at Heyst. A great many other canals have been
lished with the object of developing the system of inland naviga-
draining the low country, and irrigating the sandy soil of the Campine.

limate and Natural Productions.—Belgium enjoys a cool,
erate climate; the mean annual temperature for the whole country
° F., but on the high plateau of the Ardennes the mean is only 45°.
prevailing winds are from the south-west and west bringing moisture
the ocean, a fact which accounts for an average number of 195 rainy
in the year.

he most important natural resources are those of the mineral kingdom.
ese coal is the chief, occurring at various depths in the centre of the
try, the west and the east, following the courses of the Haine, the
ore, and the Meuse, where it accounts for the origin of the great
strial centres of Mons, Charleroi, and Liége. Iron ore is extracted
ipally in the provinces of Namur, Liége, and Luxemburg; zinc in the
nce of Liége, while stone is quarried largely in Brabant, Hainaut,
ur, and Liége, and slate in Luxemburg. The principal products of
ulture are cereals, flax, hemp, and colza, and the most important fruits
plums and apples. The great Flemish and Brabant horses, and the
er but stronger Ardennes horse have more than local fame.

eople and History.—Two distinct elements can be distinguished
e population of Belgium: a dark race preponderating in the Walloon
ict which appears to have come from the south at the most remote
od, and a fair race descended from the Kelts and Germans. The
, who were not numerous in the time of Julius Cæsar, have since
eased by immigration mainly in the north where Roman influence was
; and the people preserved their Germanic language and character,
ie south, however, the Roman influence produced a profound effect.
hence two languages still exist, Flemish (closely akin to Dutch) and
ch (Walloon), each spoken exclusively by nearly half the population.
explains the fact that almost every place in the country has a Flemish
also a French name. The linguistic dividing line runs approximately
. St. Omer in France to Visé on the Meuse.

When Julius Cæsar undertook the conquest of Belgian Gaul in the first
ury B.C., that region was bounded by the Rhine, the Marne, the Seine,
the sea, and was inhabited by 24 independent tribes. For five
uries it remained under the Romans, until the Franks who had

gradually been invading it, occupied it entirely. Thenceforward th territory of ancient Belgica was thrown into confusion, and it was sever times divided between the Merovingians and Carolingians. The fir internal divisions were formed during the administration of the Frankis counts, and many localities took their rise round their castles, or round th churches and monasteries. The feudal system was established in the ten and eleventh centuries when the counties of Flanders, Brabant, Hainau Namur, Limburg, and Luxemburg, and the episcopal principality of Lieg were established, and these served as the basis of the present provinc

In the thirteenth and fourteenth centuries the municipal system developed, and towns such as Bruges, Ghent, Ypres, Courtrai, Antwerp, and Liége rose to considerable commercial and political power. Most of these principalities were absorbed into the possession of the Dukes of Burgundy (1384–1482), but without forming a real monarchy, and they then passed by inheritance to Charles V. and Philip II. of Spain. Under the last-named prince the Belgian provinces, or the Spanish Netherlands, were ruined by persecutions and religious wars, while the northern provinces, including Holland, separat and formed the republic of the United Provinces in 1570. Attack by the French under Louis XIV. the Spanish Netherlands were hand over to the Emperors of the House of Austria (1713–95), then fro 1795 to 1815 they formed part of the French Republic and Empi In 1815 they were united with Holland as the Kingdon of the Nethe lands, but in 1830 the Belgian provinces objecting to the Dutch Gover ment became at last an independent country, the Kingdom of Belgiu

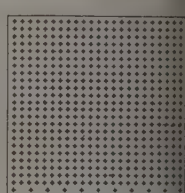

FIG. 113.—*Average popu lation of a square mil of Belgium.*

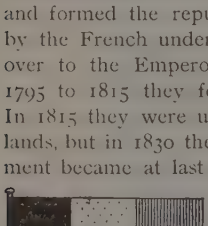

FIG. 114.—*Belgian Flag.*

The Belgians have continued since their ind pendence, as they were in the past, to be di tinguished in science and in the arts. T richness of the soil and the aptitude and intel gence of the people have caused the country rank amongst the greatest producing regions the Earth, and to support an extremely den population.

Government.—The form of government is a hereditary constit tional monarchy; the constitution promulgated in 1831 proclaims t equality of all citizens before the law, the complete liberty of religion, opinions, of forming societies, of speaking any language, of educati and of the press. It also provides for two great principles, nation sovereignty, and the separation of the legislative, executive and judici functions. The legislative power is exercised jointly by the King, t Senate, and the Chamber of Representatives. The King is the head the executive; but he exercises the power through Ministers, no

acts taking effect unless countersigned by a Minister, who y renders himself responsible. While Belgian soil has often been e-ground of European Powers—the classic field of Waterloo where eon was finally crushed in 1815 lies near the centre of the country—it n its formation as a kingdom declared neutral territory under the ntee of the chief nations of Europe. Hence it has only to maintain ent military forces to preserve its internal security. For administra- rposes the kingdom is divided into nine provinces, West Flanders, Flanders, Antwerp, Limburg, Brabant, Hainaut, Namur, Liége, and nburg, the provinces being divided into 41 arrondissements which bdivided into communes. All religions are free, and while the ns are almost all Roman Catholics (there are only about 10,000

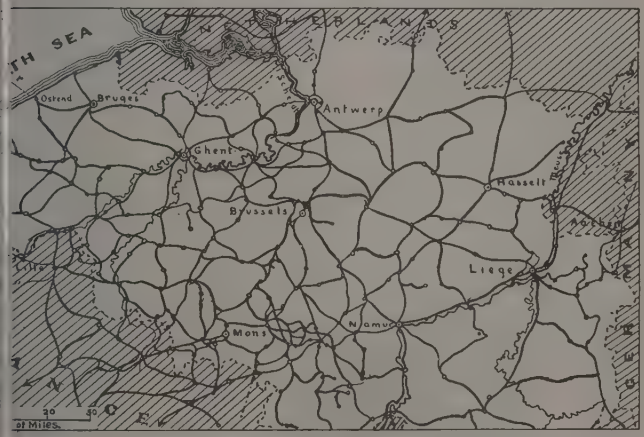

FIG. 115.—*The Belgian Railway System.*

tants and 4,000 Jews in the country) the State subsidises Roman ic, Protestant, and Jewish ministers.

dustry and Commerce.—Belgium is distinguished by its great rial and commercial wealth, which is very remarkable when the es of the country (which is only one and a half times as large as) is taken into account. Although the majority of the inhabitants are d in agriculture, the production of cereals is not sufficient to meet mand. The minerals of southern Belgium have given rise to rgical industries of all kinds, including the manufacture of iron and nd the construction of machinery, for which many large establish- have been formed, especially in the neighbourhood of Liége and of roi. The manufacture of firearms for military purposes and for has its centre at Liége; cutlery and the manufacture of glass and

crystal are leading industries of the provinces of Hainaut, Namur, and Liége. The manufacture of cloths and woollen stuffs is most developed in the neighbourhood of Verviers, that of cotton yarn and cotton goods at Ghent, and linen in Flanders. Belgium is also renowned for the manufacture of lace. The most important exports, according to value, are coal, grain of all kinds, linen yarn and raw flax, meat, cast-iron, and glass-ware. Most of the trade is done with the nearest countries, France, the United Kingdom, Germany, and the Netherlands.

The means of communication with other countries comprise first of all the steamer lines which connect the port of Antwerp with all the maritime countries in the world, the daily services between Ostend and Dover and between Antwerp and London, and finally a remarkably complete railway system, the longest per square mile of area of any country, which places Belgium in direct communication with France, Switzerland, and Italy, Vienna, and Constantinople, Berlin and St. Petersburg, thus giving to the country the full advantage of its geographical position in the matter of transport trade (Fig. 115).

Chief Towns.—*Brussels* (French *Bruxelle*, Flemish *Brussel*) is the capital of the country, the residence of the king, the seat of government, and of the legislative chambers. The population of the city of Brussels is scarcely more than 200,000; but including the eight surrounding communes (Schaerbeek, Laeken, Molenbeek, Anderlecht, St. Gilles, Ixelles, St. Josse-ten-Noode, and Etterbeek) the whole concentrated population considerably exceeds half a million. Each of these suburban communes has its own separate municipal administration. The Senne which flows through Brussels is not navigable, and water communication is carried on by a canal to the Schelde. Since 1870, great public works have transformed Brussels into a beautiful city, the Senne has been built over to guard against floods, a great central street runs from the northern to the southern stations, and other new thoroughfares have been opened. Amongst the modern buildings the Palais de Justice (law courts), the Post Office, the Exchange, and the National Bank are worthy of any capital, and amongst the ancient buildings the Hôtel de Ville (town hall), dating from the fifteenth century, and the houses of the old trade corporations which surround the Grande Place form a magnificent artistic group not to be rivalled elsewhere. Brussels contains several important picture galleries, valuable museums, an Academy of Sciences, Literature and Arts, a university, and other educational institutions, a Botanic garden and several theatres. It has thus become an intellectual as well as a political

FIG. 116.—*Brussels and its Suburbs.*

the population is rapidly increasing, and many branches of industry
en established, of which the most important are carriage-building,
struction of artistic furniture and lace-making.

verp (French *Anvers*, Flemish *Antwerpen*), situated on the Schelde,
s from the sea, from which it is separated by Dutch territory, is one
hief commercial ports of Europe; it is also an important fortified
rving as the base for the defence of the country. The old Gothic
al containing some of the most celebrated pictures by Rubens, the
of St. James, and the Steen, an old
f the fifteenth century, are amongst
t interesting of the ancient buildings.
are valuable museums, an Academy
Arts, a musical Conservatoire, and
ticularly well-arranged Zoological
. The port of Antwerp carries on
f the external trade of Belgium;
e town is consequently flourishing.
st other branches of industry which

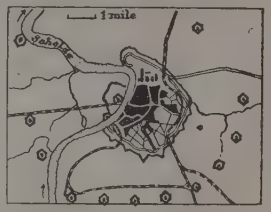

FIG. 117.—*Antwerp and its Forts.*

en attracted to the place, sugar refining, distilling, lace-making, and
lding are of great importance. *Liége* (Flemish *Luik*, German *Lüttich*)
ge industrial town on the Meuse surrounded at a distance of about
les by twelve detached forts, which in conjunction with those around
protect the valley of the Meuse (see Fig. 48). The most remarkable of
buildings is the Palace of the Prince-Bishops of Liége, dating from the
th century, and now occupied by the provincial government. Liége
s, amongst other intellectual institutions, many scientific bodies, an
ant university, especially well-equipped in the scientific depart-
a School of Mines, a School of Arts and Manufactures, a Botanic
, an observatory, and a Conservatoire of Music. The great
ial prosperity of the town is due to the neighbouring coal mines;
ncipal manufactures are firearms, the establishments including a
Arsenal and many metallurgical and engineering works. Many
ial towns occupy the neighbourhood, including *Seraing*, which
s the great engineering establishment founded in 1817 by the
nman John Cockerill, and now one of the most important in the
Ghent (Flemish *Gent*, French *Gand*), the principal town in Eas.
rs, is situated at the confluence of the Schelde and the Lys, the town
uilt upon a large number of islands in the latter river. A canal goes
ges and Ostend, and another larger one to Terneuzen on the lower
e. Ghent has played a considerable political part in the history
nders, the belfry dating from the fourteenth century, the town
ting from the fifteenth, and the ruins of the Castle of the Counts
e the memory of its ancient power. The town is now dis-
ned for its industrial development, especially the spinning and
g of linen and cotton, lace-making, and the construction of

machinery, and also for the cultivation of ornamental plants. It has a university with a school of Civil Engineering, and an Institute of Sciences; there are also a Botanic garden, a Flemish Academy, and a Conservatoire of Music.

While Belgium has developed mainly as an industrial State and now is one of the most densely peopled regions in Europe, it has entered into relations with the outer world, thanks to the foresight and perseverance of King Leopold II. He has become the sovereign of the Congo Free State, and has done much to encourage the intrepid devotion of its explorers and administrators, thereby opening up in central Africa an important market for the trade not only of Belgium but of the world.

STATISTICS.

	1875.	1895.	1900.
Area of Belgium in square miles ..	11,374 ..	11,374 ..	11,374
Population of Belgium	5,403,006 ..	6,410,783 ..	6,693,810
Density of population per square mile	475 ..	563 ..	589

NUMBER SPEAKING CHIEF LANGUAGES IN 1890.

Flemish only.	French only.	French and Flemish.
2,744,271 ..	2,485,072 ..	700,997

POPULATION OF CHIEF TOWNS.

	1875.	1885.	1895.	1900.
Brussels (including suburbs)	385,438 ..	430,543 ..	518,381 ..	561,782
Antwerp	148,814 ..	198,174 ..	262,225 ..	285,000
Liege	117,638 ..	135,371 ..	168,207 ..	173,708
Ghent	131,026 ..	143,241 ..	157,214 ..	160,959
Mechlin	.. ..	47,672 ..	53,772 ..	56,013
Verviers	.. ..	45,521 ..	51,605 ..	52,203
Bruges	.. ..	46,274 ..	49,606 ..	52,867

ANNUAL TRADE (*in pounds sterling*)

	1871–75.	1881–85.	1891–95.
Imports	52,616,000 ..	60,496,000 ..	65,321,000
Exports	42,516,000 ..	52,072,000 ..	55,464,000

STANDARD BOOKS.

A. Jourdain and L. von Stalle. "Dictionnaire Encyclopédique de Géographie de Belgique." Brussels, 1895 onwards.

The Geographical Societies of Brussels and Antwerp publish many important papers on the regional geography of Belgium.

III.—LUXEMBURG

By the Editor.[1]

ition and Extent.—The Grand Duchy of Luxemburg forms the
istern and only remaining independent portion of the once large
f that name. It separates Germany from Belgium, while on its
n side the frontiers of France and Germany meet. Except on the
ıere the Moselle and the Sauer, with its affluent the Our, form the
it has no natural boundaries, and its separate existence is due to
venience of having a neutral area between powerful neighbours.

face and Resources.—The northern part of Luxemburg,
as the Eisling or Œsling, lies on the Palæozoic slate plateau con-
the Ardennes and the Eifel; the soil is poor, and the general
sombre and rugged. The southern section known as the "Bon
s a continuation of the Triassic and Jurassic Lorraine plateau, the
of which are covered with fertile alluvium. Although the mean
of the country is little more than 1,000 feet, and the highest point
n 1,900 feet, the rivers have cut deep and narrow valleys, which
riety and even grandeur to the scenery. The forest of Grünwald is
be the largest in central Europe, and the south of the country is
ly well wooded. There are very rich deposits of iron in the south;
ıtimony, and other ores are found; alabaster of peculiar whiteness
:ellent slates are quarried.

ople and History.—The people are Teutonic in origin and
ge, though modified by the admixture of other races. French and
ı are both official languages; the former is the more generally
ut a dialect of Low German is commonly spoken by the people.
time of the Romans the territory formed part of *Belgica prima*;
he Franks it was attached to Trèves, and subsequently to Lorraine.
tenth century it was erected into an immediate fief of the empire,
Siegfried, Count of Ardennes, acquired the old Roman castle of
urgum, the site of the modern capital. In the fifteenth century it
to the Habsburgs, and continued to be a dependency of Austria
5, when it became the French department "des Forêts." By the
of Vienna, 1815, Luxemburg was freed from France, erected into
d duchy, and given to the King of the Netherlands. In 1839, by
reaty of London, dismemberment was formally effected by the
s. The larger part then became a Belgian province, and the smaller
astern portion was constituted an independent State, which passed
ıe Dutch Crown on the accession of Queen Wilhelmina. In 1867
te was neutralised by agreement of the Great Powers and the demo-
of the fortifications decreed. The government is a constitutional

[1] Assisted by E. J. Hastings.

hereditary monarchy, with a parliament of one chamber, the members o which are elected by the people for a term of six years.

Agriculture occupies the greater number of the people, and the vintag is large. Iron working is the most important industry; several conside able manufactures are carried on. Luxemburg is a member of th Zollverein, and the trade returns are therefore included with those o Germany. The main railway traversing the country north and south is link on the through line from Belgium to Switzerland.

Luxemburg (Luciliburgum, Luzilinburch, Lützelburg="little castle took its name from a castle built by Siegfried on the site of a Roma stronghold, on the Bock, a rock overhanging the opposite bank of the rive and now connected with the town by a stone bridge. The town occupie a very strong position at the confluence of the Petrusse with the Alzett It consists of two parts, an upper and a lower; the former situated on rocky plateau rising about 200 feet above the river, with precipitous cli on three sides, the only natural approach being from the west. Th natural strength of the position caused it to be selected in early time as a strategic point, and the genius of Vauban made it one of the strongest fortresses in Europe. The old fortifications have been converted into fi boulevards and parks.

STATISTICS.

	1880.	1890.	1900.
Area of Luxemburg (square miles) ..	998 ..	998 ..	998
Population of Luxemburg	209,570 ..	211 088 ..	236,543
Density of population per square mile ..	210 ..	214 ..	247
Population of Luxemburg (city).. ..	16,700 ..	18,817 ..	20,928

CHAPTER XV.—FRANCE

I.—PHYSICAL GEOGRAPHY

By Professor A. de Lapparent,
Paris

ture.—The physical structure of France exhibits, in a very high
he union of great structural simplicity with a marked variety of
eatures. France may be spoken of as formed of two parts, which
g a straight line of 530 miles, from the mouth of the Bidassoa to the
stern corner of the Ardennes near the source of the Sambre. West
ine the land projects in a triangular shape more than 250 miles to
north-west, and is surrounded by sea. The larger part, to the east,
exception of the Mediterranean coast, by which southern France
asy access to the lands of the Far East, is surrounded by a se ni-
mountains : the Pyrenees in the south, the Alps, Jura, Vosges in
the Rhine Highlands and the Ardennes in the north-east. The
dth of the country thus bounded remains over 250 miles.

France possesses natural boundaries throughout : but though
l, it is not imprisoned ; not only because more than half of its
is made-up of the coast of open seas, but because the eastern
nous girdle is interrupted at some points, such as the gap of the
between the Alps and Jura ; the opening at Belfort, between the
l Vosges ; that of Lower Alsace, between the Vosges and the
lighlands, and the gorges of the Moselle and of the Meuse, through
e highlands. In the northern corner of France, also, down the
f Artois running waters and migrating people are naturally led
plains of Belgium and Holland, and thence without obstacle to
n Germany and Scandinavia.

tral Plateau.—The chief feature of central France is that a high-
nds near its centre—the so-called Central Plateau, consisting
entirely of Archæan rocks, whose levelled surface is broken in the
by volcanic accumulations. Thus the old and denuded cones of
nt Dore and of the Cantal rise to nearly 6,000 feet above sea-level,
e Archæan base of these volcanic structures reveals itself between
d 3,900 feet. Apart from minor irregularities, the Archæan plateau
s continuously higher from north-west, where it is 1,500 to 2,000 feet,
-east. There it ends abruptly, facing the Mediterranean Sea as a
all, the dissected border of which is called the Cevennes, the highest

summit, located quite on the rim, being the gigantic Mont Lozère, 5,585 feet high. The Cevennes are succeeded in a northerly direction by the mounts of Lyonnais and Beaujolais. While on the whole elliptical in its outline, the Central Plateau is prolonged into two spurs of much the same constitution : the Morvan to the north, and the Montagne Noire to the south, approaching very near to the Pyrenees.

Geological History of the Central Plateau. — The Central Plateau is the very nucleus of France. Early in Palæozoic times it stood as an island, round which sediments were accumulating. Of varying size according to the oscillations of the crust, it has persisted as a prominent feature through the whole range of geological evolution. Only near the middle of the Tertiary period it was broken by two fractures, from north to south, leading to the formation of Tertiary lakes, the floors of which are now occupied by the plains of the Limagne and Forez, with an elevated Archæan ridge intervening between the two. In the light of the geological and topographical relations which prevail in the Central Plateau we may believe that, near the end of the Tertiary period, it ought to have been reduced to the condition of a peneplain, on the average not much above sea-level, with old rivers meandering on its surface. But when, as a consequence of the Alpine movements, the plateau was tilted as a whole from south-east to north-west, the rivers had to excavate canyons on the site of their old valleys, while volcanic activity asserted itself through the fissures of the now fractured Archæan mass.

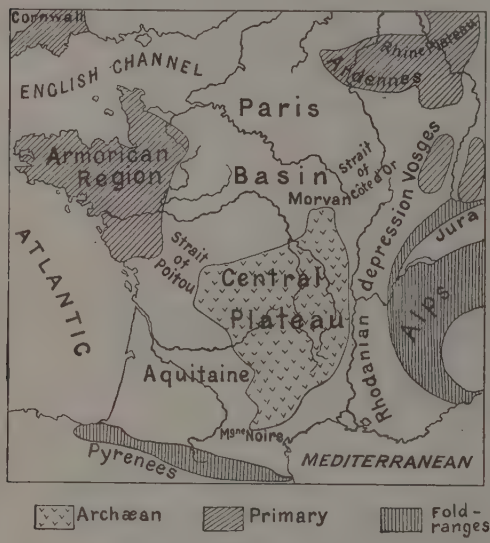

FIG. 118.—*The Physical Structure of France.*

Rivers of the Central Plateau.—Thus it is easily understood why, notwithstanding the actual dome-like shape of the country, which is entirely due to late volcanic accumulations, the rivers do not diverge outwards in all directions from a common centre as they flow. Only two directions now prevail : the one south and north, the other east and west.

were acquired before the tilting was inaugurated. So the main of river-flow are inherited from the time when the flat Archæan divided the French region into two parts, one sloping towards a ern sea, the other towards the southern belt of waters. This usion is strengthened by another characteristic feature of western ce. With the single exception of the Loire, no river comes from astern boundaries of the country to the Atlantic. The courses e Vienne, of the Mayenne, of the Orne, clearly show that there is a ed tendency on the part of the rivers to follow the eastern limit of the rican region, which embraces Vendée, Brittany and Cotentin. And, ct, this region, entirely made up of tilted and upturned Palæozoic ients, was an island early in Mesozoic times, while between it and the al Plateau stretched the so-called Strait of Poitou.

he Paris Basin.—The western highland extended far to the and was united with British Cornwall; the present state of things due to long-continued erosion by waves and currents. At the time, the similar Palæozoic land of the Ardennes became uplifted, some islands were rising on the site of the Vosges. Thus, this of emerged lands encircled a nearly closed trough of sedimenta- the Anglo-Parisian Basin, and it has been the work of Mesozoic and iry times, to fill up this trough with various sediments by the dis- ration of surrounding regions. When, about the middle of the iry period, this work had been completed, and the Oligocene Sea hed, there remained in the centre a large lake, the lake of the Beauce, hich rivers flowed chiefly from the north-east, east and south. But ake was emptied, while its floor was raised in the north-east during ene times, and a large trough was opened between Vendée and any, allowing the sea-waves to encroach as far as the vicinity of Blois efore the Loire, formerly a tributary of the lake, abruptly turned forcing in the same direction the lower courses of the Cher, Indre, se, and Vienne. Meanwhile the eastern drainage, that of the Moselle of the Meuse, found an outlet to the north through the more lately ted highland. But the central and south-eastern parts of the basin sending their waters directly to the English Channel, the old meander- eine maintaining its course by a continuous process of cutting through ecently elevated plateau of Normandy.

he Pyrenean Region.—Till the close of the Eocene period, the ern slopes of the Central Plateau were drained into a southern sea, h stretched continuously from the Atlantic to the Mediterranean rs. At that time there was no chain of the Pyrenees, and while the ern basin was submitted to the ever-changing conditions of an sed area of sedimentation, in the southern area pelagic influences ailed, resulting in a quite different and much more uniform type of sits and fossils. But when the Pyrenees begun to be uplifted, the of the Montagne Noire soon was united with the foot of the newl-

elevated mountain. Therefore the south-western slope of the Central Plateau, together with the Pyrenees, outlined a large gulf, that of Aquitaine, progressively filled up with marine, brackish, fresh water, and fluvio-glacial deposits. Thus were laid down the large and uniform plains, whose drainage is now concentrated in the Garonne, and which terminate in the great alluvial fan of the Landes.

South-Eastern France.—The south-east of France long remained under the western end of the Alpino-Mediterranean Sea, which, through the Strait of the Cote d'Or, remained in communication with the Paris Basin till the end of the Cretaceous period. Then the land was raised between Morvan and the Vosges, while the present valley of the Saône was depressed and finally became the lake of the Bresse. Meanwhile the Jura and the Western Alps were rising in crowded folds, so that between the outer folds and the linearly lifted border of the Central Plateau, there remained a Rhodanian depression. When Tertiary times came to an end, the Pliocene Sea, which had penetrated through this depression to the neighbourhood of Lyons, left the country, and its bed gave issue to the waters of the Rhone, which had forced their way through the weakest spot between the Jura and the Alps.

Surface and Soils of France.—In accordance with its geological evolution, which has been so complete and continuous as to give rise to representatives of every epoch, the surface of France exhibits an unusual variety of composition. While the Central Plateau, with the exception of the volcanic accumulations, is almost entirely composed of crystalline schists, which give an infertile soil, the old Armorican land is not much better endowed on account of the prevalence of silicious, schistose, and limeless deposits. Nevertheless, the frequent alternation of slates, grits, granites and schists, in long, narrow bands, where the harder rocks project in ridges, makes the country look much less monotonous than the Limousin.

The richest parts of France are to be sought for in the Paris Basin, where the different kinds of soil, though very numerous, have been distributed with great regularity. As the filling up of the basin has, on the whole, progressed from the rim towards the centre, each geological period being marked by peculiar sorts of deposits; as, moreover, the tilting of the lately emerged land took place towards the north-east, east, and south-east, the successive sheets of sediments, formerly buried under one another, are now exposed rising towards the borderlands on the east. Therefore they crop out, one after the other, as concentric girdles. Under the influence of running water, the softer parts in each girdle have been progressively removed on the edges, laying bare the flat surface of the more resisting ground. Now the traveller, going from Paris towards the east or north-east, walks over gently rising plains, each of which ends abruptly in a scarp facing eastward. The upper part of the scarp consists of a harder stratum, while at the

ıe softer layers, the dispersion of which has given rise to the cliff, enched. As the development of this structure proceeded *pari passu* the general uplifting of the old lake-floor, the chief rivers had to cut way through the mass of the growing cliffs, where they now run on oor of deep trenches. Every scarp-line constitutes a military front ence, where the weak points are the entrances of the valleys.

cording to the nature of the outcropping sediments, as well as to the or less advanced rate of dispersion of the projecting tongues of the ted scarps, the successive girdles are marked by contrasting land- s, where every sort of land is to be found. Dry and pervious table- of compact limestones, with rare but well-fed watercourses (Barrois, gny), alternate many times with low and argillaceous belts, covered grass and crowded with forests, where plenty of rivulets furrow the d, but only during the wet season (so-called wet Champagne). When dy girdle has been passed, another is met, the earth of which is ially fitted for agricultural purposes (Valois, Vexin, Brie), till a new of smooth and bare hills is reached, where the white chalk is to be many hundred yards in thickness (Champagne, Picardie).

ıus the numerous "*pays*" of the Paris Basin, strongly contrasting each other in a cross section of the whole, keep, on the contrary, very ant characters along the direction of the concentric belts. The ıg variety which they exhibit is due to the ever-changing conditions dimentation which prevailed, during geological times, in such a d basin, and has been enhanced by the local deformations which the ent parts of the country may have independently undergone.

levation of France.—The mean height of France averages some feet, but more than one-half of the country (that is, the western on) remains much below 650 feet ; there being only small patches of r ground between Paris and the western seas, in any direction, and one of these, in the hills of Normandy, stands a little over 1,300 feet.

he chief relief is concentrated in definite lines : (1) in the great and ot wall of the *Pyrenees*, the crest of which maintains an elevation een 6,500 and 10,000 feet ; (2) in the eastern border of the *Central au* ; (3) in the *Western Alps*, highly complicated, and culminating over o feet in Mont Blanc and Pelvoux ; (4) in the parallel and arched s of the *Jura*, growing from west to east, till the terminal crest is ed, which directly faces the plains of Switzerland in some summits of feet ; (5) in the linear crest of the *Vosges*, with peaks from 4,000 to feet, and a rather gentle slope towards Lorraine ; (6) in the elevated er of the highland of the *Ardennes*, where some points of the levelled plain are over 1,300 feet. To which must be added the high table- of Langres, which at 1,600 feet bridges over the space between an and the Vosges, serving as a south-eastern divide for the Paris n. on the very spot where the Jurassic and Cretaceous waters of the basin mingled in bygone epochs with the waves of Alpine seas.

Climate.—Thanks to such a disposition, the climate of France is a temperate one. As the true mountains of the land are all located on the eastern border, the warm and moist winds from the west, which prevail for the most part, are not stopped by any obstacle before they reach the highest summits. Nevertheless, on account of the neighbourhood of the snowfields of Switzerland and of the continental plains of Germany, the range of the thermometer is rather large, the minimum in some years reaching 13° F. in Paris, while in summer the thermometer rises there to 95° F. in the shade. Sometimes the fall and rise of temperature succeed each other very rapidly.

The great differences of altitude (the highest peak of Europe, Mont Blanc, 15,800 feet, belongs to France), cause every kind of climate to be encountered, from the mouth of the Loire, where frost is almost unknown, to the perpetual snows of the Alps, with the intervening high plateaux of the Cevennes where, during many months, a bitter wind is constantly blowing. The mean annual rainfall for the whole of France amounts to 29½ inches, varying from a minimum of under 19½ inches on the Mediterranean coast from Perpignan to Narbonne, and 19½ to 23½ inches in the region between Le Mans and Reims, to a maximum of 71 inches which is reached on the western corner of the Pyrenees, while on the Mont Dore, Cantal, Morvan and Vosges the rainfall is little over 60 inches. The general distribution of rainfall may be seen on the map of rainfall of Europe in Fig. 53.

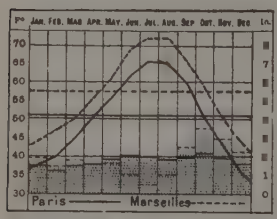

Fig. 119.—*Curves of Mean Monthly Rainfall and Temperature for Paris and Marseilles.*

Mineral Resources.—France has been very poorly endowed with precious metals; iron ore is rather abundant, especially in the state of oolitic layers. The coal-fields, though numerous and scattered, are not sufficient to prevent the necessity of importing from abroad. The country is exceptionally rich in building stones: either products of internal activity, like the granites of Brittany, Normandy, and the Central Plateau; the trachytes and lavas of Auvergne, the porphyries of Esterel, or consolidated sediments of the various geological epochs. For examples of the latter kind we may mention the marbles and roofing slate of the Palæozoic deposits; the Jurassic limestones, mostly oolitic, which are nowadays extensively quarried in Lorraine, Burgundy, Berry, Poitou, Lyonnais, &c.; the fire-clays of the lower Cretaceous formation; the tufaceous chalk of Touraine; the building-stones of the so-called rough limestone, so largely developed in the neighbourhood of Paris; the travertines, plaster-stones, silicious millstones, and gritty paving-stones of the same basin; and the calcareous molasse of Provence.

Volcanic activity has now entirely disappeared from the country, and

historic times not the slightest eruption has taken place in Auvergne, e the freshness of the craters and volcanic cinder-cones bears testi- that internal fires must have found vent not many centuries before ettlement of the district. But in many parts of France, and always in iation with the remnants of extinct vulcanism, or with the manifesta- of recent displacements of the crust, there are to be found thermo- al springs, successfully used for curative purposes. They occur the foot of the Pyrenees, round the old eruptive centres of rgne, in the Alps, the Vosges, and on the fractured rim of the an.

lora and Fauna.—As France is everywhere in free communication adjoining countries, its *fauna* does not essentially differ from that of rn and central Europe. But, owing to the want of extensive forest- or mountain masses, the range of wild animals is becoming smaller, being now for the most part artificially protected for sport.

he *flora* is a rich one, on account of the great differences of climate, rding to varying altitude and exposure. As the high mountains of the try generally face westward, that is seaward, their slopes enjoy better itions than they could have done if turned eastward. Thanks to its al situation the south-eastern corner of France, called Provence, is the garden of the country. There eucalyptus, introduced from Australia, iving, as well as the native olive and mulberry. For the remainder of and oak, beech, lime-tree, yoke-elm, and the various sorts of maple- are the prevalent forest species, pine and fir being confined to ntains or to sandy grounds. With the exception of the mountainous , peat is to be found only to the north of Paris. The productions of the try are in accordance with the diversity of physical conditions. the wind-swept downs of the North Sea to the "azure coast," e a vegetation of almost tropical character thrives on the sun- ning slope of the Southern Alps ; from the vineyards of the Medoc e Côte d'Or to the Alpine woods and pastures below the perpetual s ; from the blooming grasses of Normandy to the desolate plateaux e Causses every type of vegetation or cultivation is represented.

II.—GENERAL GEOGRAPHY

By Professor L. Raveneau,[1]
Of the "Annales de Géographie," Paris.

eople and Language.—The French people, like the English or the nan, is made up of several races. In passing from Flanders through and Poitou to the Gironde one can recognise amongst the people the ntial features of the Gauls ; they are typically fair-haired, tall, and long- ed (dolichocephalic). In the west of France, Vendée, Anjou, Maine,

[1] Translated from the French by the Editor.

and Brittany, and on the Central Plateau in the heart of Cæsar's Celtica, the people have, as a rule, dark hair, and are short and thick-set with broad heads (brachycephalic), representing a much earlier invasion which had evicted the yet more ancient reindeer hunters and the remnants of the Quaternary races. In the Mediterranean region in the south-east and in Aquitaine in the south-west there are traces of the early Ligurian and Iberian peoples. Migrations which are still going on within the country have brought about a general fusion of all these races into one fairly homogeneous general type.

The Gauls, when conquered by the Romans, forgot their own language and adopted Latin, from the popular form of which the new French language gradually formed itself. The language had taken shape by the twelfth century—about the time when France acquired a national existence: but it appeared in two dialects, the northern or *langue d'oil* (*oil* = *oui* = yes) and the southern or *langue d'oc* (*oc* = *oui* = yes). The dialect of the Ile de France and of Touraine, which was spoken by the kings, gradually superseded the other dialects of the *langue d'oil* in the north, but was not received with the same readiness in the south where some dialects of the *langue d'oc*, Provençal amongst others, are still spoken. The French language is used beyond the political limits of France; the Walloon dialect is spoken throughout the whole of southern Belgium, and even in a corner of Prussia (Malmedy); it is also spoken in part of Lorraine, annexed to Germany in 1871, in several cantons of Switzerland, and in the high valleys of the Italian Alps. On the other hand the Flemish language encroaches upon the northern part of the department of the Nord, and Italian dialects are spoken in part of the Alpes-Maritimes and Corsica. Most of the inhabitants of the Pyrénées-Orientales still speak the Catalan language. At the western end of the Pyrenees the French Basques, who differ anthropologically from the much more numerous Basques of Spain, speak the same Euskarian language, the origin of which baffles the researches of philologists. Finally, in lower Brittany the Keltic language in four dialects is used by the peasants living to the west of a line drawn from the river Vilaine to Chatelaudren.

Territorial Growth.—Neither community of race nor of language would have sufficed to form the nation; two other forces were necessary, a line of kings working for centuries to build up the provinces into one country, and a devoted people supporting their royal leaders without stint of money or life. At the time when the Duke of Normandy conquered England in 1066 his suzerain, the King of France, only possessed in his own right Valois, Ile de France and Orléanais. In the following century, as by the turn of a tide, England occupied the whole Atlantic coast of France, and for a time the French king was nothing more than King of Bourges. Jeanne d'Arc and Charles VII. recovered the territory, but Calais, the key of the Channel, was held by the English for another century. Interrupted by the chivalrous epic of the expeditions into Italy and by the sanguinary

ıde of the religious wars, the policy of territorial consolidation was :d by Henry IV. Richelieu and Mazarin added to France the "four ıs": Roussillon, Piémont (Pignerol), Alsace and Artois in 1648 to 1659. r the personal reign of Louis XIV. the frontier reached the Alps at lonnette in 1713 (the possessions beyond the Alps had been given 1697); it had already advanced towards Switzerland, incorporating :he Comté in 1678, and towards the Spanish Netherlands, encroaching ınders in 1668. Louis XV. acquired an *enclave*, Lorraine, in 1766, and :ed Corsica in 1768. The Treaty of 1814 left to France the *enclaves* which een suppressed during the Revolution (Comtat Venaissin, Mühlhausen, béliard), but required the restoration of the fruits of Napoleon's ıests in Belgium, Holland, Germany (Hamburg), Switzerland (Geneva), taly (Rome). France gave up Savoy and Nice, gained during the blic, and only touched the Rhine through Alsace. The Treaty of 1815 : into the northern frontier by the loss of Philippeville, Marienburg, Landau. As a reward for the part taken by France in securing the of Italy Napoleon III. recovered the departments of Savoy and Nice, ıhabitants of which ratified their change of nationality by a popular

The war with Germany and the Treaty of kfort in 1871 threw back the French frontier e crest of the Vosges, and Alsace and Lorraine incorporated without the consultation of the ›itants as an Imperial Territory of the German ire.

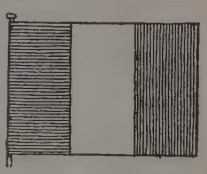

FIG. 120.—*The French Flag.*

·overnment.—Since 1871 in fact, and since by law, the form of government in France been that of a constitutional republic. The *ıber of Deputies*, elected directly by universal male suffrage, and the *te* nominated by a special electorate, exercise legislative powers, and :d in *Congress* they elect the President of the Republic who exercises the utive authority through responsible Ministers. The democratic spirit ıe country assures to all free education and the right of voting, and ›ses in return compulsory personal military service. All religions are ated and the State allows an annual subsidy to Roman Catholic, estant, and Jewish ministers. The majority of the people are Roman olics.

Administrative Divisions.—In 1790 the National Assembly sub- ted for the old French provinces 83 departments. This number was :d to 89 by the creation of Vaucluse, the splitting of Rhône-et-Loire, formation of Tarn-et-Garonne, the annexation of the two departments ıvoy and the Alpes-Maritimes; and since 1871 it has been reduced to y the cession of the whole Bas-Rhin, of the Moselle, with the exception he arrondissement of Briey (which was united to Meurthe to form rthe-et-Moselle) and of Haut-Rhin with the exception of the territory Belfort. At the head of each *department* Napoleon placed a Prefect as

an agent of the central authority, and at the head of the *arrondissement* a sub-prefect. Each of the 36,000 *communes*, except Paris, is administered by an elected mayor.

A larger, more elastic, and more geographical division is tending gradually to be superimposed upon the departments. This is the *Region*, represented by the ecclesiastical division which the National Assembly had adapted to the departments, and also used by the Courts of Appeal and the Academies instituted by Napoleon, by the Army Corps (for which there are 19 regions including Algeria, created in 1872) and finally by the Universities, to which the State has recently restored liberty and vitality.

Movements of the Population.—The population increases very slowly; from 1872 to 1901 the total increase was not so much as 3,000,000, while in the same period the population of Germany had increased by more than 18,000,000. While the French Canadians continue to increase perhaps more rapidly than any other civilised people, the birth-rate in France itself has fallen lower than that of any other country in Europe. The increase, such as it is, results not from the general growth of the population but from the exceptional increase in a few departments. From 1846 to 1896 the five departments of Seine, Nord, Rhône, Loire, and Bouches-du-Rhône, showed an increase greater than the average for France; a large number of departments have remained stationary, while those of Normandy and of the basin of the Garonne show a marked diminution. Different parts of France exhibit important movements of the population in the form of temporary removals, such as the exodus of people from the Central Plateau or the Alps to Paris, Lyons and Marseilles for work with the prospect of returning, and also of permanent displacement. The population of the department of the Seine in 1896 was made up of people coming from other parts of the country to the extent of 56 per cent. The rural population, that is to say people living in communes which do not contain an aggregation of more than 2,000 inhabitants, is diminishing, while the urban population increases: thus the rural population amounted to 75 per cent. of the whole in 1846, but only to 61 per cent. in 1896. The population of 34,000 purely rural communes is diminishing to the profit of from 400 to 500 towns; the number of towns with a population exceeding 30,000 has increased from 54 in 1886 to 69 in 1901. These currents of internal migration cross and at some points mix with those of immigration. Between 1851 and 1891 the number of foreigners living in France increased by 200 per cent., and in the latter year exceeded a million. Foreigners are very numerous in the large towns and in the departments near the frontiers, forming, for instance, one quarter of the population of the arrondissement of Lille, and concentrating in two places in the interior, at Ile de France

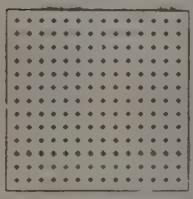

FIG. 121.—*Average population of a square mile of France.*

ıdour-Garonne. A law passed in 1889 facilitates naturalisation, and ıles that the children born in France of foreign parents who were ıelves born in the country are by birth French citizens.

ıere is at present but little emigration from France, and figures can y be given (say about 10,000 per annum). The people of the Basses- emigrate to Mexico where they are known as Barcelonnettes, the ıes habitually make their way to the Plata States, and people from lediterranean coasts have established themselves as vine-growers in ia. It is estimated that half a million French citizens live in foreign ries.

griculture.—Half the total surface of France is made up of arable and almost half the working population (46 per cent.) is occupied in ılture. Peasant proprietors are very numerous and cultivate their land tireless assiduity. Agricultural societies are gradually extending the of fertilising agents and the employment of scientific methods. ugh the greater part of the arable land (58 per cent.) is devoted to the th of cereals, and produces annually from 300 to 330 million bushels of t (nearly 19 bushels per acre on the average), the French, being great s of white bread, require, when the harvest is poor, to import wheat the United States and Russia. Maize, for which a moist and warm ıte is necessary, grows mainly in the basin of Aquitaine; barley associ- with hops supplies many breweries in the north and east, and beetroot, rated on a large scale in the plains of Flanders, Picardy, Brie, Beauce Limagne, is used for the production of alcohol in distilleries attached e farms, or for the manufacture of sugar in sugar-mills. While the on large farms tends more and more to assume an industrial character, narket gardens of Provence, Agenais, and Anjou supply fruit to the ets of Paris, and the early produce of Brittany (the Golden Belt) is largely exported to London. Horse and cattle breeding is an rtant branch of farming on the coast of Flanders, the pastures of the d'Auge, the meadows of Perche, Bocage of Vendée, and the "prés bouche" of Nivernais and Charolais. Sheep are largely kept on the dry ıres of Champagne Pouilleuse and of the Causses, those of Crau are n summer on the mountain pastures of the Alps and of the Cevennes, the custom in Spain and Italy. Dairy-farming and cheese-making per in Boulonnais, Bray (Neufchatel), Lower Normandy (Camembert), ıany (Prévalaye), the Central Plateau (Roquefort), and the Jura.

The vine was formerly cultivated as far north as the shores of the ınel, and in Champagne it is still grown north of lat. 49°, but otherwise eal importance is now confined to the valleys of the Saône (Côte and Mâconnais) and the Rhone, to Lower Languedoc and Bordelais, nce there has been a regular export of wine to England since the ıdred Years' War. The production of wine in France is greater than in Italy or Spain, although it has been very seriously affected by the lloxera pest; a production of 1,850 million gallons in 1875 having been

reduced to 550 million gallons in 1887 ; but the vineyards have now been restored by the introduction of American plants, and in 1900 the production of wine in France exceeded 1,500 million gallons. The vine is associated in the valley of the Rhone with the mulberry, employed for rearing silk-worms, in Provence with the olive, and in the neighbourhood of Nice with the orange.

Industry.—Mineral and textile industries support one quarter of the population, but France is far from being so favoured as Great Britain in this respect ; its output of 33 million tons of coal (in 1900) is insufficient, and an annual import of from 12 to 15 million tons from England, Belgium and Germany is required. The numerous coal-fields include the group of the Nord and the Pas-de-Calais, which yield 60 per cent. of the total production, and those of the Loire (St. Etienne), Burgundy and Nivernais (Le Creusot), Gard (Alais), Tarn and Aveyron (Aubin, Carmaux), and Bourbonnais (Commentry). Altogether 140,000 workmen are employed in coal mines. The average price of the coal at the pit mouth varies from 7s. 6d. per ton in the northern coal-fields to 11s. per ton in the Loire field ; but on account of the cost of transport the price as sold in the department of Haute-Vienne is increased to 29s. per ton, a fact which acts prejudicially on the manufactures of districts far from the coal-fields. The coal production of France is shown graphically in Fig. 70. Iron ore is largely extracted from the oolitic rocks at Nancy and Briey, the department of Meurthe-et-Moselle yielding nine-tenths of the iron raised in France, and in the Oolite of Champagne (Vassy) ; some iron is also produced in Franche-Comté and the Pyrenees. The production of cast-iron, wrought-iron and steel exceeded five million tons in 1900, most of it being produced in Meurthe-et-Moselle, at Le Creusot, the rival of Essen in Germany and Seraing in Belgium, and at Fives-Lille. Building materials and other mineral products are obtained by quarrying. The more important are marble from the Pyrenees, building stones from Lorraine, Burgundy, Berry, and Bordelais, mill-stones and hydraulic cement from Ardeche, plaster from the neighbourhood of Paris, as well as phosphate of lime (Somme and Pas-de-Calais), and marl.

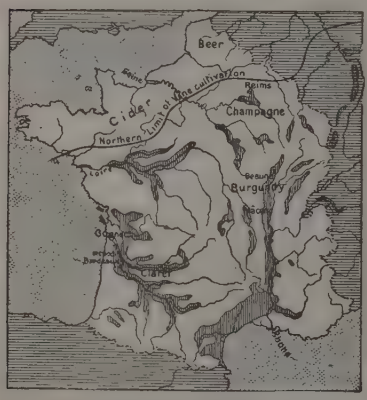

FIG. 122.—*The range of the vine in France—shown by vertical shading.*

Textile industries flourish most in the neighbourhood of coal-fields and near the supply of raw materials. With the coal-field of the Nord the spinning and weaving of linen, hemp, jute, and cotton are closely associated.

: other coal-fields, St. Etienne manufactures ribbons, Roanne cotton and Lyons is the queen of the silk trade. The old Norman weaving ·y is now represented by the cloths of Elbeuf and Louviers, and ttons of Rouen. Some industries have grouped themselves near alls on the slopes of the Vosges (cotton-weaving); in the valley of ère, where there are paper-works and glove factories at Grenoble oiron; along the banks of large rivers of pure water, such as the nte with the gun-factory of Ruelle and the paper-works of Angou- and of the Essonnes with the paper-works and flour-mills of Essonnes orbeil. Historical reasons and industrial tradition have as much as geographical conditions in explaining the woollen industries of pagne (Reims), and Languedoc (Mazamet), the cloths of Sedan, the ain of Sèvres and ges, the carpets of ins, Beauvais, and son, the mirrors of bain, and the crys- Baccarat.

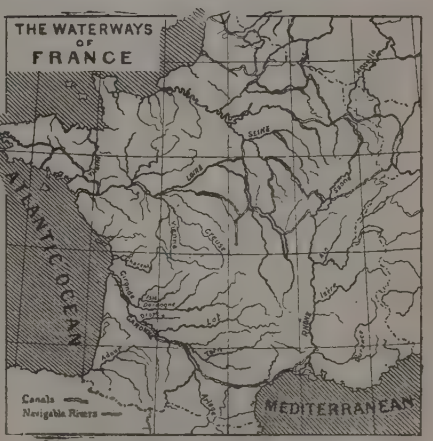

FIG. 123.—*The Rivers and Canals of France.*

eans of Com- ication.—Trans- nd trade furnish a ood to 13 per cent. e population. The s of communication rise a close net- of roads which are ded with just pride; comprise the na- high roads, the mag- nt engineering of is a heritage from nt France, depart- l roads and parish roads. The expansion of railways has thrown erved discredit on the old roads which, after all, are their natural aries. Steam tramways and motor cars, not to speak of bicycles, have, ver, led to an increase of road traffic, which produces its effect on the nal statistics.

aterways.—The rivers, whose harmonious arrangement had attracted tention of Strabo, have been regulated and deepened so as to render current more uniform and permanent. A depth of nearly 7 feet now ils in more than a quarter of the rivers used for navigation. Engineers made projects for improving the sluggish and capricious Loire, and have overcome in part the rapid current of the Rhone, for although scent of that river is always difficult it is descended by numerous s. In the north of France the triumph of the engineers is complete.

Works carried on between 1878 and 1886 have established a depth of water exceeding 10 feet on the Seine between Paris and Rouen, and the traffic on that section has doubled in less than 20 years. Paris has become the principal port of France, and although, strictly speaking, it cannot be termed a seaport, it yet maintains regular direct communication with such places as Nantes and London. The natural waterways are supplemented by an excellent system of canals, the best of which are those of the north and east of France, but one-half of the canals in the country have a depth exceeding 6½ feet. Water transport has been rendered more and more economical by the introduction of steam traction, and of such modern developments as electric power in the tunnel of the Burgundy canal, and hydraulic lifts at Fontinettes on the Neuffossé. Forty-two per cent. of the mineral fuel for Paris is brought into the city by water. The system is of particular service in facilitating the exchange of heavy and bulky products between the north and east by the canals which join the Oise to the Marne and the Rhine, coal coming from the north, cast-iron and iron-ore from the east. The recently constructed Eastern Canal, and the canals joining the Marne to the Saône and the Doubs, which are on the point of completion, unite Franche-Comté to Champagne and Flanders. The canal of Briare, the first canal with level reaches which was constructed in France, and the Central Canal with their branches form important arteries of traffic between Paris, Montluçon, Roanne, and Châlon-sur-Saône.

Railways. The railway system converges on Paris even more conspicuously than do the roads and canals, and each company's lines radiating from Paris serves a separate sector of France; the cross lines as a rule have only moderate traffic except the sections from Dunkirk to Nancy, from Amiens to Châlons and Chaumont, from Caen to Le Mans by Alençon, from Tours to Vierzon and Châlon-sur-Saône, and from Bordeaux to Cette.

The *Northern Railway* (*Chemin de Fer du Nord*), with a total extent of 2,300 miles, covers a small territory with a close network; its traffic is proportionally greater than that of the other lines as it serves a very fertile, populous, and industrial region. On this system Lille is 153 miles, or 3 hours, from Paris; Brussels 193 miles, or 4½ hours; Berlin 665 miles, or 18 hours, and the distance of 1,680 miles to St. Petersburg is covered in 48 hours by the Northern Express. Only 7 hours are required for the journey from Paris to London by Calais and Dover, or by Boulogne and Folkestone, and the Northern Railway is the link connecting Great Britain, by the shortest sea passage, through Paris with all parts of Europe. Special through trains connect Calais with Basel in 14 hours *viâ* Châlons-Chaumont; with Nice *viâ* Paris in 20 hours, and with Brindisi, the port of the Far Eastern mails, *viâ* Paris and Modane in 40 hours. The section of the Northern Railway between Amiens and Paris is one of the busiest in Europe, and some of the international trains travel over it at the remarkably high average rate of 56 miles an hour.

The Eastern Railway (*Chemin de Fer de l'Est*), has a system of 2,900 miles

:. By Nancy, it connects with the south of Germany and Austria
ia 870 miles in 22 hours). The Oriental Express runs from Paris to
antinople, a distance of 1,900 miles in 62 hours. Another line by Chau-
and Belfort communicates with Switzerland, reaching Basel in nine
and Milan by the St. Gothard tunnel in 18 hours from Paris.

e Paris Lyons and Mediterranean Railway (*Chemin de Fer Paris-Lyon-*
errannée, or shortly *P.-L.-M.*) is the largest system in France, serving
reatest area, and with a total length of 5,400 miles of line. The
tance of this great central artery of trade, which follows the old
il route formed by the valleys of the Yonne, the Saône, and the Rhone,
lained by the diversity of the districts which it unites, and the variety
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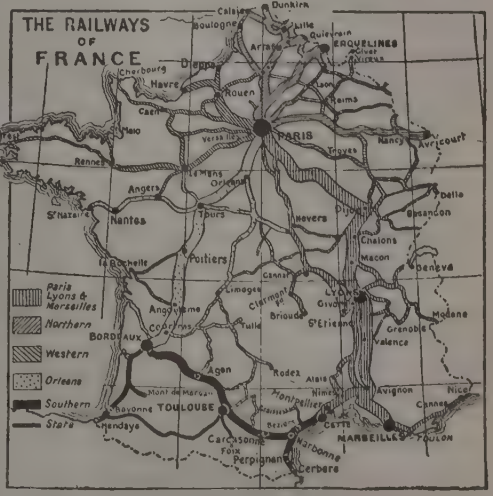

FIG. 124.—*The French Railway System. The breadth of the lines indicates the volume of traffic.*

lines to Switzerland; one from Dijon by Pontarlier to Lausanne, the other from Mâcon to Geneva. Two lines also go to Italy; one Mâcon, Modane, and the Fréjus (Mt. Cenis) tunnel to Turin and on to e, a distance of 910 miles, traversed in 29 hours from Paris. The nd line runs along the coast of the Mediterranean from Marseilles. *he Paris-Orleans Railway* (*Chemin de fer Paris-Orléans*) and the *Southern way* (*Chemin de fer du Midi*) meet at several places, and, unlike most of French lines, one occasionally penetrates the territory of the other. connect the Spanish railway system with the French by one line d the eastern, and another round the western extremity of the Pyre-

The most important section of this system is that through Orléans

and Tours to Bordeaux, 363 miles, traversed in 7 hours. This journey can also be made by the *State Railway* (*Chemin de fer de l'Etat*), *viâ* Chartres and Niort. The Southern Express from Paris by Bordeaux reaches Madrid, a distance of 930 miles, in 27 hours. Another line connects Paris with Limoges and Toulouse. The lines of the Orléans company have a total length of 4,300 miles, those of the Southern company 2,100 miles, and those of the State Railway 1,750 miles. The Neussargues-Béziers line traverses the Central Plateau by a series of great engineering works including the viaduct of Garabit. The departments of the Charentes and Vendée are served by the State Railway, while the districts of Anjou and southern Brittany have the advantage of the rivalry between the Orléans and the Western companies.

The Western Railway (*Chemin de fer de l'Ouest*, 3,500 miles), runs from Paris to Brest, a distance of 387 miles, accomplished in 11 hours; but this line is only important as far as Rennes. Other lines run to Granville and Cherbourg, but the heaviest traffic of the system is carried on in the neighbourhood of Paris, and on the great artery of trade running from Paris to Rouen, and terminating at Havre (141 miles, covered in 3 hours) and Dieppe, the latter on the route to London *viâ* Newhaven.

Ocean Routes and Commerce.—The railways bring Paris into touch with the great lines of ocean steamers. The *Messageries Maritimes* unite Marseilles with the ports of the Mediterranean, and through the Suez Canal with Madagascar, Indo-China, Japan, Australia, and New Caledonia (in 37 days). From Bordeaux steamers of this line touch at Lisbon and go on to Dakar in West Africa, or to Rio de Janeiro in 16 days, and to Buenos Aires in 21 days. The *Compagnie Générale Transatlantique* runs from Marseilles to Algiers in 24 hours, from St. Nazaire to Colon and Vera Cruz, and from Havre to New York (7 days).

The mercantile marine of France is declining; not from the want of sailors, for the fisheries on the coast and in distant seas rear a vigorous race on the Mediterranean, the Atlantic, and the Channel; but because the seaports have not been improved in an adequate manner, and on account of the difficulty which vessels landing large cargoes find in obtaining an adequate return freight. France, in fact, imports more than she exports, just as she receives more foreigners than she sends out emigrants. The *imports* as a rule consist of raw materials for manufactures which are in general bulky: coal from the United Kingdom, copper from Chile, flax and hemp from Russia, jute from India, cotton from the United States, raw silk from the Levant and the Far East, wool and hides from the Cape, Australia and the Plata, wood from Norway and from America. The principal food-products imported are grain from Russia and the United States, and coffee from Brazil. The *exports* include agricultural produce such as wine, fruit, butter and cheese, but consist mainly of manufactured articles of small weight and high price, too expensive indeed for customers who in all countries are more and more demanding cheaper and

:r goods ; they consist mainly of fine woollen cloth, silk, cotton, and nnumerable artistic manufactures known as *articles de Paris*. The ations of the total trade of France are shown graphically in Fig. 71.

egions and Towns of the North. — France possesses three tant seaports in the North Sea and on the Channel. *Dunkirk* pre- its deep and commodious harbour to ships from the north, between shore bordered by dunes and the watery plain of the Wateringues. a repellant line of chalk cliffs the triple town of *Calais* stretches along hore, comprising the port with its immense passenger traffic, the ed town, and the industrial St. Pierre-les-Calais. *Boulogne* lies un- sively on a little estuary amongst meadows. The relief of the country id these seaports is as undecided as the political frontier which was d at Lens and saved at Denain. The character of the populous towns e north still exhibits the old ish pride softened by the wider cipal spirit of Flanders. *Lille* been, thanks to Vauban, the ipal fortress of the north, and ow the first post in the great of frontier fortifications which, some gaps protected by the nd line of defence, stretches as s Belfort (see Fig. 48). The k Country of Belgium seems e prolonged underground to nining district of Anzin and , while the Flemish textile in- y, which preceded that of and and France, has revived in the sister-towns of *Tourcoing* *Roubaix* which are now united he growing suburbs of Lille.

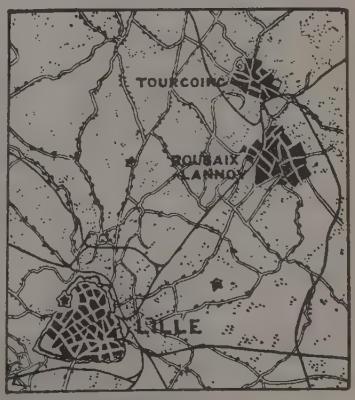

FIG. 125.—*The manufacturing district of Lille.*

towns of the Somme share the intense industrial activity of French ders, especially *Amiens*, where the full river flows slowly through a y valley at the base of long ridges denuded of chalk, and *St. Quentin*, capital of the district of Vermandois, where a canal unites the Somme the Oise.

One of the outlying hills of the old province of Ile de France is crowned he citadel of *Laon*. Another, the Montagne de Reims, displays a rich ring of vineyards on its slopes, and conceals in the cellars beneath its ace millions of bottles of champagne. The town of *Reims*, where is was baptized and the kings of France consecrated, covers with its ories the beginning of the plain of Champagne. Champagne Pouilleuse two centres, *Châlons-sur-Marne* with its great camp, and *Troyes*, the e of one of the most ancient fairs in northern France. Further east,

beyond the mountain ridge of the Côtes de Meuse, are the two strongly fortified episcopal cities *Verdun* and *Toul*. A furrow in the plateau of Lorraine is marked out by the blast furnaces near *Nancy*, a city proud of its squares and of its monuments, the heritage of Stanislas.

Paris, situated in the hollow of the Paris Basin 85 feet above sea-level, is a centre towards which flow not only the rivers converging to the Seine but the commodities of the surrounding countries and the people of France and of the world. Originating on an island in the Seine, and at first, like London, a resting place for sailors, it has spread over the higher ground of both banks, until now it is bounded on the south, near Villejuif, by the lower slopes of an agricultural plateau, and is expanding in suburbs of villas towards *Vincennes*, and as a town of factories to the north including *St. Ouen* and *St. Denis*. On the west there are extensive woods, now divers

FIG. 126.—*Paris, showing Fortifications.*

sified by numerous active towns including *Neuilly, Boulogne,* and *Sèvres;* in the centre of these forests Louis XIV. created *Versailles,* with its beautiful gardens and artificial lakes. Paris illustrates the rich past of France in its monuments, and reflects the varied aspects of the country in the daily life of its people. Its beauty, made up of contrasts softened by time, makes many a Frenchman forget his province and attracts many a foreigner from his native land.

Normandy.—The lower Seine, become a tidal river, bears on one of its wide curves the ancient city of *Rouen,* the spires of its old churches and the masts of its shipping standing out against the sky; while cotton factories dot the little valleys cut deeply into the plateau of the Pays de Caux or Upper Normandy, the surface of which is covered with well wooded farms. The third port of the Seine, *Havre,* created by Francis I. has killed Hartleur and strangled the trade of Honfleur, although it has not

ted from the ancient maritime fame of *Dieppe*. Havre does a large in coffee from Brazil and wheat from the United States, and great mills have been established in the town. The capital of Lower andy is the market town and seaport of *Caen* on the Orne. The from its famous quarries were used in the construction of some of orman buildings in England, and stone quarrying is still an important ndustry. The Campagne de Caen is prolonged beyond *Alençon* by ampagne Mancelle, adapted for the growth of cereals and the rearing ltry, by which the town of *Le Mans* in particular prospers. The fortified f *Cherbourg* stands at the extremity of the peninsula of Cotentin, the gy of which marks it as Breton rather than Norman; the breakwater, has made it an excellent naval harbour, required a century and a or its completion.

ittany.—Brittany, a land of granite and schists, appears infertile interior, the poorly cultivated ground being broken up by woods and moorlands. The coast, on the contrary, bathed by the warm ic water, is richly cultivated, and has also important sardine fisheries. ndented coast of the peninsula of Brittany abounds in harbours in- g *St. Malo*, an old haunt of corsairs; *Morlaix*, which exports early bles to England; *Brest*, a naval port on a great roadstead, the entrance ich, however, is rendered difficult of access by reefs and frequent *Lorient*, another naval port, mainly of value as a dockyard where h men-of-war are built and repaired; and *Nantes*, on the Loire, one two capitals of Brittany. The people of Nantes have endeavoured, e construction of a direct outlet to the sea (the Loire Ship Canal, d in 1892), to recover their ancient prosperity, formerly fostered by est Indian trade, which has been seriously menaced by the competi- the rising port of *St. Nazaire* at the mouth of the river. The other l is the old parliamentary town of *Rennes* lying in a Tertiary basin sed by the railway and canal from St. Malo to *Redon* along a track has always been an important north and south road.

ıe Loire Basin and Central Plateau.—*Angers*, near the on of the Maine and the Loire, is a centre for the surrounding rds and slate quarries. *Tours*, at a point where several fertile vine- ıg valleys open out on the Loire, is surrounded by parks and fine y houses. *Orléans*, on the most northerly curve of the Loire, stands en the district of Beauce on the north, which has always been one of anaries of France, and that of Sologne, formerly a pestilential plain ow greatly improved. From its commanding position Orléans played iderable part in the Hundred Years' War and in the war of 1870–71; de, formerly very active, suffers from the loss of the boat traffic on ver. *Bourges*, situated almost in the geometrical centre of France, is incipal market town of the old province of Berry, the country ed by the tributaries of the Loire which flow northwards from the ıl Plateau. *Clermont-Ferrand*, high on the Central Plateau, is the

successor of the old Gaulish town of Gergovia, and stands between the range of the Puys and the Limagne, a region of old lake beds now bearing rich harvests; *Royat*, which almost touches it, and *Vichy*, not very far to the north, are famous for their mineral waters. *Limoges* stands at the meeting-place of several important routes which skirt the Central Plateau, and although far from the sea and far from coal mines, it is a prosperous industrial town on account of kaolin, the material for the manufacture of the porcelain which it produces, abounding in its neighbourhood. *Poitiers*, an old ecclesiastical and feudal town, commands the uniform plateau drained by the western rivers flowing from the Central Plateau to the Loire and uniting the Paris Basin with the south-west. On account of this position it has been the scene of many decisive battles.

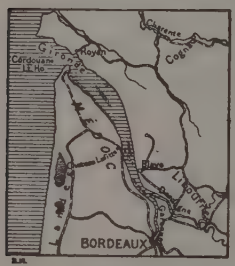

FIG. 127.—*The Gironde Estuary.*

The South-West.—*La Rochelle*, with its new suburb *La Pallice*, has not yet recovered the importance which it formerly held as the Protestant capital. *Rochefort*, on the plain of Cognac, is an important naval harbour in spite of the tendency of the river Charente, on which it stands, to become blocked by sand. *Bordeaux*, founded by the Romans and long held by the English, stands on the Garonne in the centre of an ancient wine-growing district, which has retained its prosperity because it has in great measure escaped the ravages of the phylloxera. With its outport, *Pauillac*, on the Gironde, it carries on active trade with Great Britain, West Africa, and South America. The splendour of its monuments attests the antiquity of its origin and the power of its commercial traditions. *Pau*, the capital of the old province of Béarn and the birthplace of Henri IV., in the midst of a wine-growing region, is the most important of the Pyrenean towns, some of which, like *Cauterets* and *Bagnères-de-Luchon*, are much frequented watering-places on account of their thermal springs. *Toulouse*, half way between Bordeaux and Cette, on the most easterly curve of the Garonne, is in the centre of rich grain-growing plains, whence there is easy access to the Central Plateau and to Languedoc.

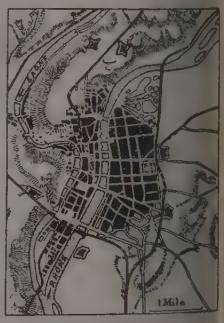
FIG. 128.—*Lyons.*

The South-East.—In the basin of the Saône *Dijon*, the capital of the old province of Burgundy, stands at the junction of the routes from the west and north by the valleys of the Yonne and the Marne and at the commencement of the vineyards of the Côte-d'Or. *Besançon*, encircled by a curve of the Doubs, is the key of the Jura, the plateaux of which are

d with pasturage while the valleys shelter numerous small industrial largely engaged in watch-making. *Lyons* is ranged upon the lower of the eastern wall of the Central Plateau at the junction of the and the Rhone, where the lake-dotted plateau of the Dombes meets ountainous Dauphiné. It is the second town in France for popula- or industrial activity, and the enterprise of its capitalists; in the silk t is unsurpassed. The neighbouring town of *St. Etienne* combines g and the making of fire-arms with the manufacture of ribbons. The valley of the Rhone and the plain of Languedoc are dotted with old n towns, forming regular stages on the first great road built in Gaul: se are *Vienne*, *Orange*, *Avignon*, the papal city; *Beaucaire*, the glory south in the Middle Ages; *Nîmes*, which still retains many fine rials of the past; and the old commercial and university town of *llier*, still celebrated for its Medical School. *Cette* was founded in the eenth century as a seaport to replace Narbonne, had become an inland town by the silting up flat shore. *Marseilles*, on the edge of the old n province of Provence, of which *Aix* has long he centre, has been successively Greek, Roman, nçal, and French. Beside the old harbour, the f which has become classic in the whole Medi- ean, the docks of La Joliette are thronged with vessels trading with the East, not only French but the steamers of British companies which it the port for embarking passengers for India ustralia. *Toulon* conceals in the depths of its arbour the vessels of war of the French Mediterranean fleet, and aval shipbuilding yards. Further east the Azure Coast takes on an n splendour at *Cannes* and *Nice*, the favourite winter resort of the igns of Europe and of a considerable portion of their subjects.

FIG. 129.—*Marseilles.*

onclusion.—Although France is a remarkably homogeneous country presents a great variety of soil, climate, and productions. This ity is reflected in the national character, typically lively and frank, otwithstanding appearances, lacking neither in energy nor earnest- France, toiling under the burden of a heavy history, has been ced by younger and better equipped nations in some branches of n activity, but it has never ceased to maintain its old reputation for intelligence, sociability and generous hospitality.

STATISTICS.

	1886.	1896.	1901.
rea of France in sq. miles[1] ..	207,127 ..	207,127 ..	207,127
opulation (total)	38,219,000 ..	38,518,000 ..	39,031,000
French and naturalised ..	37,092,000 ..	37,490,000 ..	37,993,000
Foreigners	1,126,000 ..	1,027,000 ..	1,037,000
ensity of population per sq. mile	184·5 ..	186 ..	188

[1] is value, calculated by the Geographical Service of the Army, is preferable to that of square miles, the area calculated by the Survey Department (*Cadastre*).

THE FOREIGN POPULATION OF FRANCE.

	Belgians.	Italians.	Germans.	Swiss.	Spaniards.	British subjects.
1891 ..	465,000 ..	286,000 ..	83,000 ..	83,000 ..	77,000 ..	39,000
1896 ..	395,000 ..	292,000 ..	91,000 ..	75,000 ..	77,000 ..	36,000

POPULATION OF CHIEF TOWNS.

	1886.	1896.	1901.		1886.	1896.	1901.
Paris ..	2,344,000	2,536,000	2,660,000	Brest	71,000	74,000	81,000
Marseilles	376,000	442,000	494,000	Nimes ..	70,000	74,000	80,000
Lyons ..	402,000	466,000	453,000	Tourcoing ..	58,000	73,000	79,000
Bordeaux..	241,000	256,000	257,000	Montpellier ..	57,000	73,000	76,000
Lille ..	188,000	216,000	215,000	Rennes ..	66,000	69,000	74,000
Toulouse..	148,000	149,000	147,000	Dijon ..	61,000	67,000	70,000
St. Etienne	118,000	136,000	146,000	Grenoble ..	52,000	64,000	68,000
Le Havre..	112,000	119,000	129,000	Orléans ..	61,000	66,000	67,000
Nantes ..	127,000	123,000	128,000	Tours ..	51,000	63,000	64,000
Nice ..	77,000	93,000	125,000	Le Mans ..	58,000	60,000	62,000
Roubaix ..	100,000	124,000	124,000	St. Denis ..	48,000	54,000	59,000
Rouen ..	107,000	113,000	115,000	Calais ..	59,000	56,000	59,000
Reims ..	98,000	107,000	107,000	Besançon ..	56,000	57,000	55,000
Nancy ..	79,000	96,000	102,000	Versailles ..	50,000	54,000	54,000
Toulon ..	70,000	95,000	101,000	Levallois-Perret	29,000	47,000	54,000
Amiens ..	80,000	88,000	90,000	Troyes ..	47,000	52,000	53,000
Limoges ..	68,000	77,000	83,000	Béziers ..	43,000	48,000	52,000
Angers ..	73,000	77,000	82,000	Clermont-Ferrand	47,000	50,000	52,000

INTERNAL COMMERCE ON RAILWAYS AND WATERWAYS.

		Length. Kilometres.	Miles.	Amount of Traffic. Kilometre-Tons.[1]	Percentage
1895	Railways ..	36,337 ..	22,579 ..	12,898,000,000 ..	77 } 100
	Waterways ..	12,281 ..	7,631 ..	3,766,000,000 ..	23 }
1899	Railways ..	42,433 ..	26,355 ..	13,716,000,000 ..	75 } 100
	Waterways ...	12,130 ..	7,534 ..	4,489,000,000 ..	25 }

SHIPPING TRADE—EXTERNAL AND COASTING—OF THE CHIEF SEAPORTS.

In Tons weight of goods entered and cleared.

	1891.	1900.		1891.	1900.
Paris	6,878,000 ..	9,301,000	Dunkirk ..	2,132,000 ..	2,901,000
Marseilles ..	4,798,000 ..	6,221,000	Rouen ..	1,780,000 ..	2,684,000
Le Havre ..	3,044,000 ..	3,459,000	St. Nazaire ..	1,153,000 ..	1,755,000
Bordeaux ..	2,635,000 ..	2,853,000	Algiers ..	— ..	1,327,000

MERCHANT TONNAGE OF FRANCE.

	Sailing Ships.	Steamers.	Total.
1891	426,000 ..	522,000 ..	948,000 register tons.
1901	564,000 ..	546,000 ..	1,110,000 " "

ANNUAL TRADE[2] OF FRANCE (*in pounds sterling*).

	1867–76.	1878–86.	1887–96.	1898–1901.
Imports ..	136,300,000 ..	178,400,000 ..	164,250,000 ..	184,000,000
Exports ..	132,250,000 ..	133,900,000 ..	136,300,000 ..	159,400,000

PERCENTAGE COMPOSITION OF SPECIAL IMPORTS.

	Food Products.	Raw Materials.	Manufactures.	Total.
1895..	.. 27·8 ..	56·5 ..	15·7 ..	100
1901..	.. 17·0 ..	66·3 ..	16·7 ..	100

PERCENTAGE COMPOSITION OF SPECIAL EXPORTS.

	Food Products.	Raw Materials.	Manufactures.	Total.
1895..	.. 17·5 ..	26·0 ..	56·5 ..	100
1901..	.. 18·7 ..	26·2 ..	55·1 ..	100

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[1] A kilometre-ton is 1 ton of goods carried for 1 kilometre of distance.

[2] Special trade only, *i.e.*, Exports of home products or manufactures and Imports consumed in the country.

FRENCH TRADE WITH OTHER COUNTRIES.

Mean of 1898–1900.

Country.	Total trade. Pounds sterling.	Imports into France. Pounds sterling.	Per cent. of imports.	Exports from France. Pounds sterling.	Per cent. of exports.
d Kingdom	70,000,000	23,500,000	13	46,500,000	29·6
h Colonies	34,000,000	16,000,000	9	18,000 000	11·2
any	33,700,000	16,200,000	9	17,500,000	11
ium	31,500,000	14,200,000	7·8	23,300,000	15
d States	30,500,000	20,800,000	11·4	9,700,000	6·2
	15,500,000	10,500,000	5·7	5,000,000	3·2
tine Republic	13,000,000	11,000,000	6	2,000,000	1·3
	12,500,000	6,000,000	3·2	6,500,000	4·2
erland	12,000,000	3,500,000	2	8,500,000	5·4
	10,700,000	9,200 000	5	1,500,000	1
ier countries	70,000,000	51,000,000	27·9	19,000,000	11·9

THE FOREIGN POSSESSIONS OF FRANCE

	Area sq. miles.	Population.
h India	200	273 000
h Indo-China	275,000	16,000,000
a	184.000	4,740,000
	50,000	1,600,000
a	1,300,000	—
h West Africa and French Congo	2,000,000	18,000,000
h Somaliland	14.000	200,000
gascar and Comoro	228,700	2,580,000
on	900	173,000
can Possessions	31,000	380,000
Caledonia	7,500	51,000
e Islands	1,600	31,000
Total Foreign Possessions	4,100,000	44,500,000

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CHAPTER XVI.—SWITZERLAND

By Émile Chaix,

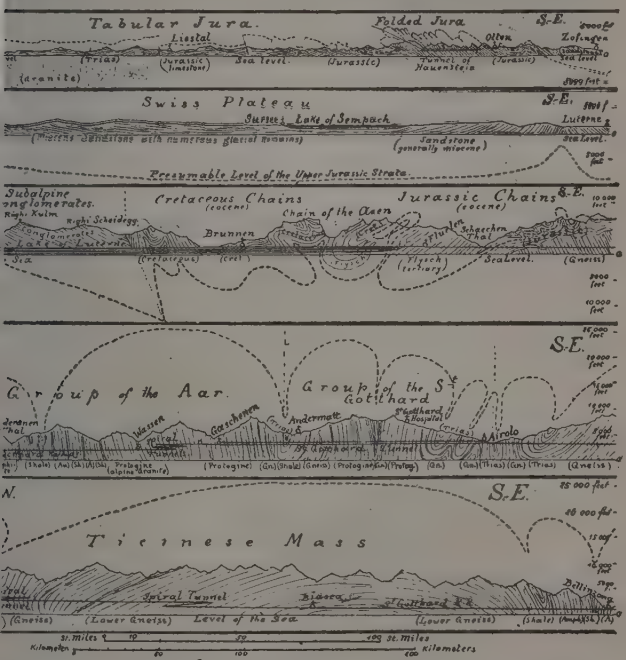
Professor of Geography in the Ecole Supérieure de Commerce of Geneva.

Position and Boundaries.—Switzerland (German *Schweiz* from Canton Schwyz, French *Suisse*, Italian *Svizzera*), lies between 46° and 48° N., or, on the average, 3° to the south of Lizard Head. It extends in longitude from 6° to 10½° E.; and is thus as far east from Greenwich as the Island of Valentia lies west of it. The country is somewhat less than half the extent of Ireland. It measures little more than 200 miles from west to east, and 120 from north to south. Switzerland is a sort of buffer State between France, Germany, Austria and Italy. The Jura mountains form a natural boundary towards France, and, except for the Canton of Ticino, the main crest of the Alps is the frontier towards Italy; but the details of the boundaries are complicated and do not follow natural features.

Configuration and Geology.—Switzerland is naturally divided into four geological zones, extending across the country from south-west to north-east, and roughly parallel to each other. The first zone, to the north-west, is formed by the *Jura*, a limestone region, some 3,000 feet in height, folded into a series of parallel waves. The second zone is the *Swiss Plateau*, composed of sandstone partially covered by the glacial deposits of the Ice Age. It is very irregular and hilly, varying in height between 1,000 and 3,000 feet above the sea. The remainder of Switzerland, about three-fifths of the whole, occupies the *Alps*, which are divided into two broad bands differing widely in character. The northern limestone Alps are stupendously folded, the folds being driven north-westward and piled up over each other. The central crystalline Alps occupy all the southern and south-eastern part of the land; they are formed of huge masses of gneiss, granite, and other crystalline rocks, cropping out amid schists, and rising in many places to over 13,000 feet (Fig. 130). The action of running water has deeply modified the primitive structure. Only a few rivers, viz., the upper parts of the Rhone, the Rhine, and the Inn, continue to flow along longitudinal valleys, parallel to the south-west and north-east trend of the original folds; most run through transverse valleys excavated right across the folds towards the north-west, and exhibiting a succession of gorges and basin-like expansions. Denudation has been and is still intense. Large rivers have pushed their sources as far back as they could, to the very heart of the mountain groups, cutting through or turning

s, and each tributary is pursuing the same work in its smaller
of action.

rography.—The principal system of rivers is formed by the
nd its tributaries flowing to the North Sea; then come the Rhone,
to the Mediterranean, the Ticino (Tessin), which discharges into
aggiore and thence into the Adriatic, and the Inn flowing to



—*Profile across Switzerland, from Basel to Bellinzona. Showing the Folds of the and the Alps; the dotted curve representing the Upper Jurassic Strata (partly thetical) as they may have been before being worn away. Worked out from E. lberg and C. Schmidt, by E. Chaix.*

nube and thence to the Black Sea. Switzerland is thus the point act of many river systems.

e **Rhine**, after many changes in its direction, has worked its way up Oberalp Pass. It has not yet completely graded its bed, since it waterfall of 60 feet at Schaffhausen, and rapids somewhat lower Its different higher tributaries descend from the St. Bernardin and n Passes, from the Julier Pass, Albula Pass, &c. The great Lake of nce (Bodensee) forms part of its course. The *Linth* rises in the

Alps of Glarus ; on leaving the Lake of Zürich under the name of Limmat, it flows into the Aar close to the junction of the *Reuss*. The Upper Reuss, before traversing the Lake of Lucerne, has cut its way in wild gorges through all the folds of the northern Alps, and carried its head to the centre of the system, the group of the Furca, St. Gothard and Oberalp Passes. The *Aar* comes from the Grimsel Pass, and its tributaries have radiated into the middle of the Bernese Oberland ; it traverses the lakes of Brienz and Thun, and carries all the drainage of northern Switzerland to the Rhine. The *Thièle* (Zihl) rises, under the name of Orbe, in the valley of Joux in the Jura, and after flowing for some miles in an underground channel, passes through the lakes of Neuchatel and Bienne to join the Aar.

The Rhone has cut its way through the French Jura, and through the northern folds of the Alps at the foot of the Dent du Midi, up to the Furca Pass. Its southern tributaries penetrate deep into the Pennine Alps, and it leaves Switzerland after passing through the largest of the lakes, the Lake of Geneva (Leman), which is rather more than 200 square miles in area, and 1,000 feet in maximum depth.

Mountains.—Besides being worn away by water and weather, all the Alpine system must have subsided after the glacial period. That movement determined the formation of the elongated lakes that surround the central Alps both in Switzerland and in Italy. The principal rivers have isolated and defined different groups of mountains (see Fig. 31). Between the Rhone and Aar lie the *Alpes Vaudoises* and the *Bernese Oberland*, with the summits of the Rochers de Naye, Moleson and Niesen in the limestone zone, and, in the crystalline zone, the Finsteraarhorn (14,026 feet), Jungfrau (13,672 feet), Mönch (13,440 feet), Wetterhorn, &c., grouped in one compact mass of snows and rugged peaks above the valleys of Lauterbrunnen and Grindelwald. More than twenty summits tower over 12,000 feet, and this group possesses the longest of all the 600 Swiss glaciers, the Aletsch Gletscher, sixteen miles in length. Between the Aar and Reuss extend the *Alps of Unterwald*, almost severed by the Brünig Pass. Among the summits the Brienzer Rothhorn and Pilatus (7,000 feet) are best known because of their railway. At the convergence of the headwaters of the Reuss, Rhine, and Ticino lies the *St. Gothard group*, cut off on all sides by important passes. Between the Reuss, the Rhine, and the Walensee extend the *Alps of Glarus and Schwyz*, with the Tödi (11,887 feet) in its centre and the hotel-crowned Righi (5,906 feet) in its north-western corner. Farther to the north-east the romantic *Sentis group* (8,215 feet) is isolated by the Walensee. South of the long Rhone valley the *Pennine Alps* extend as a splendid chain, carved into gigantic buttresses by the short southern tributaries of the Rhone. Round Zermatt gathers the most bewildering succession of bold peaks : Monte Rosa (15,217 feet), Mischabelhörner with the Dom (14,941 feet), Weisshorn (14,803 feet), and the incomparable pinnacle of the Matterhorn or Cervin (14,705 feet). Over thirty other summits exceed 12,000 feet. The next group to the east are the *Alps of*

rofoundly trenched by torrent valleys. Between the Ticino, Rhine. lie the *Alps of Grisons* (Graubünden), a powerful complex, deeply by the tributaries of the Rhine. It culminates in numerous exceeding 10,000 feet, including Piz Kesch, and Adula, and d by the high passes of St. Bernardin, Splügen, Julier, and Albula. o the south-east of the Inn the splendid *Bernina group* towers to a of 13,288 feet. As to the *Jura*, its summits do not exceed 5,500 l its limestone ridges have effectively withstood partition by rivers. ctual snow begins at heights varying between 8,500 and 10,000 feet, ng to the exposure of the slopes, to their convex or concave profile, the extent of the high masses; but glaciers come down to 4,500 erpetual ice and snow spread over 800 square miles, or one- h of the total area of Switzerland.

nate.—Were Switzerland at sea-level it would enjoy a temperature between 35° F. for the average in January, and 72° for July. But rmal temperature is greatly modified by the altitude, diminish- an average by 3° for each thousand feet of elevation. Thus the emperature of the plateau oscillates with the altitude between 32° for January, and between 68° and 62° for July, while much mperatures occur on the mountains. Another cause of great dif- s in climate is the exposure: the northern slopes of the mountain- eceive direct sunshine, while the southern slopes catch the solar perpendicularly as flat ground does in the tropics. During winter, above 6,000 feet often enjoy splendid weather while cold fogs n the lower valleys. There are great extremes of temperature in ence of strong insolation during the day, and active radiation at rough the pure and thin air of the heights; and above 4,000 or eet the atmosphere is exceedingly free from noxious micro- ns.

diness and rainfall are great; rain falls mostly with westerly and y winds, and the amount varies with the exposure of the Windward slopes generally get more than 60 inches of rain (some as much as 90); but Geneva receives less than 33 inches. ts of Canton Valais only 20, being protected by mountain ramparts eet high on all sides. The dry hot Föhn wind descending the n slopes of the Alps is a characteristic feature of some valleys. As the climate of Switzerland is not favourable to agriculture, but igorating for man.

ra and Fauna.—Switzerland possesses many wild plants and which, although interesting, are generally useless. The flora of nmits, many members of which grow also in Scandinavia and rgen, is charming. One-third of the area of Switzerland is entirely s, being covered with ice or bare rock, while of the remainder an half is available only as pasture, one-third is clad with forest, ly one-ninth of the whole area can be cultivated. Between

6,500 and 4,000 feet forests are composed of Rolle pines (*Pinus cem* larches and fir-trees ; under 4,000 feet beeches are prevalent, and oaks chestnut-trees are abundant only in the southernmost parts of the cou Agriculture is generally not practised above 2,500 feet.

Wild animals are becoming rare ; hardly a bear is left, no wolves few lynxes ; there are no more ibex (*Capra ibex*), chamois are few extremely shy, and so are marmots and blackcock (*Tetrao uroga* Eagles and bearded vultures (*Gypaetus barbatus, Lämmergeier*) are qu disappearing.

People and History.—The first inhabitants of Switzerland wh somewhat important traces were the lake-dwellers ; but the earlie historic times were the *Helvetians*, of Keltic race. They were conqu by Julius Cæsar, and Helvetia remained under Roman rule down t great migrations from the north. Then it was occupied by three peo the *Allemanni* in the north and east, the *Burgundians* in the west, an

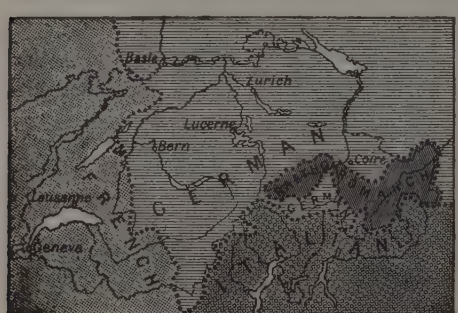


FIG. 131.—*The Languages of Switzerland.*

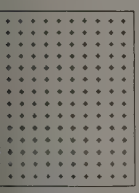
Ostro-Goths in the s The Allemanni reta their Germanic langu while the others ado the Latin. In the century Helvetia united under the Fr and Christianity wa tablished by Irish sionaries. In the elev century the German perors ruled over whole country. Dukes of Austria s quently attempted to usurp the government, but the Cantons of Sch Uri and Unterwald, which had made a first covenant in 1291, renewed the Grütli in 1307, and resisted and defeated the Austrians at Morga In the first half of the fourteenth century Lucerne, Zürich, Glarus, Zug Bern joined these cantons, and this Confederation of Eight Cantons many wars became free of the German Empire, and from time to their number was increased. During the first Revolution the Fr entered Vaud in 1798, and in place of the Confederation of Thi Cantons, then existing, they erected a "Republic one and indivisible," France. But there was no peace in the country until the former Feder was restored in 1815, with the accession of fresh cantons, making tw two in all. The neutrality of the Confederation is now guaranteed b European Powers.

Language, Religion, and Government.—Switzerland has inhe many things from its past, especially in the distribution of religions languages. Of the total population, 72 per cent. speak a German dialect,

Italian (in Ticino), 1 per cent. Raetho-Romanch dialects (in Grisons), 22 per cent. French (in Valais and Fribourg, Geneva, Vaud, Neuchatel the Bernese Jura). The non-German part of the country is often termed an or Welsh Switzerland. On account of the vast number of tourists visit Switzerland, English is spoken as a foreign language by a very number of the people. In religion the cantons of Bern, Glarus chatel, Schaffhausen, rgau, Vaud and ch are almost en- Protestant; those Fribourg, Lucerne, yz, Ticino, Unter- Uri, Valais and are almost entirely an Catholic. In other cantons the religions are more ss mixed. On the e three-fifths of population are estant, and two-fifths Roman Catholic; there are only 8,000 Jews.

FIG. 132.—*The Religions of Switzerland.*

he federal institutions are obviously a consequence of the topography istory of Switzerland, the people of each valley or region having long by themselves before uniting with their neighbours. Each canton is te, with its own constitution and government; but common affairs are nistered by a common executive power and two legislative assemblies. Every citizen has a vote. Two important and unusual rights exist: the *Referendum*, by which the people can always oblige the authorities to submit newly made laws to a general vote of the country; and the *Right of Initiative*, by which a group of citizens may at any time propose any new measures and submit them to a general vote.

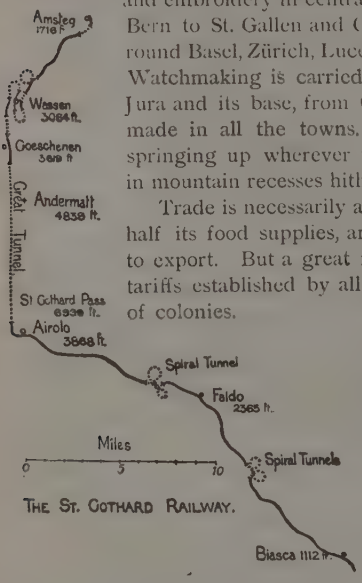


33.—*Average Population of a square le of Switzerland.*

Public instruction has long been general, and is constantly progressing. Besides the general schools, there are all kinds of educational institutions, technical, agricultural, commercial, and six universities, their seats in Basel, Bern, Geneva, Lausanne, Zürich and Fribourg. migration is large, but the population nevertheless increases. The n density of population is 184 inhabitants to the square mile; but it rally varies greatly. In the industrial cantons—such as Geneva (914), l, and Zürich—it is high; in the agricultural cantons it approaches average; and in the Alpine cantons like Valais, Uri, and especially ons (34), it is very low.

ndustries and Trade.—Agriculture is as well developed as it can

be with mediocre soil and climate. Wheat is grown everywhere on Plateau under 2,500 feet, but it yields only half the quantity required the country. Grapes are cultivated, in good exposures, generally up to 1 feet (in Valais and Ticino even to 2,000 feet); but the country wants tw as much wine as it produces. Wood must be imported. Even cattle meat are not sufficient; cattle, however, are reared for dairy produce, furnish under that form a good export, cheese being made everywh and condensed milk in many places. Silkworms are reared in Tic Notwithstanding the absolute lack of raw materials, there is a str industrial development. The principal industry is cotton manufac and embroidery in central and north-eastern Switzerland, f Bern to St. Gallen and Glarus; then come silk manufact round Basel, Zürich, Lucerne and in Ticino, and straw-plait Watchmaking is carried on on a very large scale along Jura and its base, from Geneva to Basel; and machiner made in all the towns. Electro-chemical works are springing up wherever water-power may be obtained, in mountain recesses hitherto untouched by manufactures.



THE ST. GOTHARD RAILWAY.

FIG. 134.—*Map of the St. Gothard Railway.*

Trade is necessarily active in a country which must imp half its food supplies, and has so many manufactured go to export. But a great inconvenience results from the h tariffs established by all surrounding countries and the l of colonies.

Communications.—Roads railways are very difficult to estab on account of the configuration the land. Yet the network of ro is complete, and that of railway already highly developed. G carriage roads follow all the l valleys of the Alps, and many l passes are crossed by splen causeways. Five railways cross Jura. There are two great tra alpine lines, one carried under the St. Gothard (see plan in Fig. 134, and tion in Fig. 130), and the other, which is the longest tunnel in the wo twelve miles, under the Simplon, from the Rhone valley. The Platea covered with a complete network of railways, and lines penetrate al many valleys into the very heart of the Alps. Some important in national routes pass through Switzerland, especially the St. Goth route from Germany to Italy through Basel, Lucerne and on to Mi the Arlberg route from France to Austria through Basel, Zürich eastward through the Arlberg tunnel; and from the south of Fra to Bavaria, through Geneva, Bern, Zürich and Winterthur. For convenience of tourists a great many mountain railways have been

ed, actuated by cog-wheels, or worked by cables, and a daring ct for an underground railway to the summit of the Jungfrau is in ess. Only the lakes and very short stretches of a few rivers are ble for navigation. Post, telegraph and telephone penetrate every-, and are highly organised.

antons and Towns.—Soil, climate, and all conditions of exist- are so much better on the Plateau, that most of the inhabitants and tant towns are found there, though the progress of communica- and industry, and the increase of pleasure-tours have led to the h of noteworthy places everywhere. The canton of **Grisons** bünden) occupies the upper basins of the Rhine and Inn. *Coire*) was an important station for the Romans, and is yet noteworthy se of its situation at the convergence of many frequented passes. , in a high valley, is much resorted to as a winter sanatorium. The dine, the elevated valley of the upper Inn, has an excellent summer te, splendid mountains, lovely lakes, and important mineral springs *Moritz* and *Tarasp*, which attract many tourists. The canton of **Uri** ies the upper valley of the Reuss. The railway ascends the valley ops and spiral tunnels to *Goeschenen*, where it s the long horizontal tunnel of St. Gothard. he carriage road continues over the Devil's ge to the valley of *Andermatt*, where four s meet, now defended by fortifications The n of **Unterwalden** lies among the mountains of the lake of Lucerne traversed by the rail- o the Brünig pass. The canton of **Schwyz**, centre of Swiss freedom, touches the lakes ucerne and of Zürich. *Schwyz* is surrounded by many visited resorts, ding the battlefield of Morgarten, *Einsiedeln* with its pilgrimage, and Righi. The canton of **Glarus** occupies the quiet, secluded valley of inth ; and its villages are full of cotton-factories. The canton of **St.** extends between the Rhine and the Lakes of Constance, Zürich Walenstatt. The manufacturing town of *St. Gall* preserves the rich script collection of its ancient monastery. *Ragatz* is much frequented ts hot springs. The lovely canton of **Appenzell**, round the Sentis, ctive manufactures of cotton goods and embroideries in all its towns. **hurgovia** (Thurgau), along the lake of Constance, has an active rt of Hungarian corn at *Romanshorn* on the lake The canton of **affhausen** projects into Germany beyond the Rhine. *Schaffhausen* *Neuhausen* stand near the Rhine cataract ; the former is known for ediæval appearance ; the latter for its manufacture of arms and alu- um. The canton of **Zürich** is a great centre of industry. *Zürich* is argest town in Switzerland. It possesses a university, the federal echnicum, the national museum and important manufactories for silk machinery. *Winterthur* is very important as a manufacturing town,

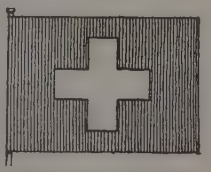


FIG. 135.—*The Swiss Flag.*

The canton of **Zug**, with its pretty capital, is concerned with textile ma
factures. The canton of **Lucerne** contains the town of *Lucerne*, w
its old towers, its covered wooden bridges and other attractions, which
much visited by tourists because of its situation near Mount Pilatus,
Righi and the picturesque lake.

Argovia (Aargau) occupies an exceptional position near the c
fluences of the Rhine, Aar, Limmatt, and Reuss. *Aarau* is known for
manufacture of mathematical instruments. Near *Brugg* stand the ruins
Habsburg Castle, the cradle of the imperial family of Austria, and th
of a large Roman city, Vindonissa. The canton of **Basel** (Bâle) lies
the point where the Rhine leaves Swiss territory. The town of *Ba*
has always been conspicuous because of its situation which makes it
busiest railway centre in the country. The canton of **Soleure** (Solothu
is half on the Aar and half in the Jura. *Soleure*, with the surrounding sm
towns, and *Olten*, where important railways meet, are all busy w
machinery and smelting works. The canton of **Bern** is large, occupyi
the Oberland, a part of the Plateau and the Bernese Jura. *Bern* is
federal capital, containing the federal palaces, numerous internatio
offices, a fine cathedral and university. The Emmenthal is far-fam
for its cheese, but is still more active in weaving and spinning. T
Bernese Jura with *Bienne* (Biel), and other towns and villages, are occupi
with watch-making. *Thun*, in a lovely situation, is the principal milit
centre in Switzerland. Between the two lakes of Thun and Brie
Interlaken is a haunt of tourists visiting the grand scenery of the Oberla
The canton of **Fribourg** on the Sarine is covered with excellent pastur
Fribourg, an old town on a picturesque site, with celebrated suspensi
bridges over the surrounding gorges, has a Roman Catholic universi
Further up stands *Gruyère*, in a lovely valley famed for its cheese.

The canton of **Neuchatel** is well known for watch-making. The to
of *Neuchatel* is more celebrated for its schools, its museum and its wine, b
Chaux-de-fonds, in an arid region over 3,000 feet in elevation, and *Le Lo*
with a watchmakers school, are the greatest centres for watch-making
Europe. The agricultural canton of **Vaud** extends from the Jura to
Alps. *Lausanne* occupies a magnificent position. It possesses a very bea
ful cathedral, the federal supreme courts and a university. Along the east
bank of the lake, named La Vaux, and famed for its wine, lie *Ve*
Montreux, and other resorts of invalids and tourists in spring and autur
In the north, *Avenches* (Aventicum) was the capital of the Roman Helve
and *Ste. Croix* is known for its manufacture of musical-boxes. The can
of **Geneva**, at the west end of the Lake of Geneva, is almost entir
surrounded by French territory, which lessens the natural advantages
its situation *Geneva* is very old, but has few ancient remains. It is far
as a religious, educational and scientific centre. The making of chro
meters, jewels scientific instruments and chemicals is very activ
particularly since the establishment of great water-works on the Rh

ting, as it leaves the Lake of Geneva, 30,000 horse power. The
of **Valais** occupies the high valley of the Rhone. *Sion* is
esquely dominated by three rocks crowned with ruins, and
ny stands at the entrance of the valley leading to the far-famed
St. Bernard. *Leukerbad* (Louéche), at the foot of the Gemmi pass, is
for its hot springs. To the south of the Rhone a series of
id side valleys opens, in one of which *Zermatt* lies at the foot of the
horn. Farther up *Brieg* is a point whence roads radiate to numerous
including the Simplon Road, established by Napoleon I. for war
es, which has served as a model for subsequent mountain-roads.
nton of **Ticino**, on the southern slopes of the Alps, is occupied by
speaking Italian. *Bellinzona* is the chief town. At the entrance of
Gothard tunnel lies *Airolo*, now fortified. *Locarno*, on Lago
re, and *Lugano* on the northern bank of its lake, enjoy marvellous
, and wholly Italian climate and vegetation.

STATISTICS.

	1880.	1890.	1900.
a of Switzerland square miles	15,964	15,964	15,964
ulation	2,827,572	2,938,009	3,315,443
sity of population per square mile ..	177	184	207
ulation of Zürich	75,960	96,900	152,942
„ „ Basel	61,400	63,500	113,000
„ „ Geneva	68 300	74,800	105,139
„ „ Bern	44,100	46,500	64,864

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* The statistics of value of trade commence in 1885.

CHAPTER XVII.—THE GERMAN EMPIRE

By Dr. Alfred Kirchhoff,[1]

Professor of Geography in the University of Halle.

Position and Extent.—Germany is the most central country Europe. It occupies almost the whole north and west of central Eur viewed from the morphological centre of the continent, the Fichtelgebi as the main mass of Austria occupies the south and east from the sa centre. Germany extends from the Alps to the North Sea and the Baltic, o a range of latitude corresponding to that from the mouth of the Loire a the north-eastern apex of the Sea of Azov in the south, to that of Glasg and Moscow in the north. The position in longitude is the same as t of Scandinavia and of Italy. South Germany, a comparatively narr tract south of the northern watershed of the Main, is enclosed by Fran Switzerland, and Austria-Hungary; North Germany, which is much larg is bounded on the west by Holland, Belgium, and Luxemburg, and the east by Russia and Austria-Hungary. Almost two-thirds of boundaries of Germany are land frontiers, and one-third is compo of sea coast on the north. The peninsula of Jutland projects betw the short coast-line on the North Sea and the much longer coast of Baltic, forming the bridge between Germany and Danish Jutland, a next to East Prussia, the most northerly part of the German Empire. T length of Germany in a north and south direction, from the Königsau, boundary river towards Jutland, to the southern point of Bavaria near source of the Iller, is exactly the same as that of Great Britain. Fr the north-west to the south-east, from northern Schleswig to Upper Sile the distance is also almost the same; but the diagonal from south-we north-east, from Upper Alsace to East Prussia, is much longer; the dista being as great as from Gibraltar to Nice. Amongst the countrie Europe, Germany is only surpassed in area by Russia and Austria-Hung France comes very closely after it, and Spain is not much smaller. S Germany extends, like the south of England, through 8° of longitu while North Germany extends over 17°.

Configuration.—The German Empire has been formed in the gre natural region of Central Europe, which is shared also by Holla Belgium, Luxemburg, Switzerland, and the part of Austria which belong to the German Confederation until 1866. But Germany alone occup

[1] Translated from the German by the Editor.

of all the four zones into which the surface of Central Europe is ally divided, viz., the Alps, Alpine Foreland, Central Highlands, and ern Plain.

he Alps.—Germany has but a small share of the Alps, limited only northern limestone Alps on the southern borders of Bavaria, betwee ake of Constance and Salzburg. In this district alone does the sur f Germany approach or exceed 6,500 feet in elevation, heaved up by reat pressure from the south to which the Alps as a whole owe their . Here alone does Germany extend into the region of eternal snow, ghest summit being the Zugspitze, 9,710 feet above sea-level.

he Alpine Foreland.—Germany occupies the Alpine Foreland from ake of Constance to the mouth of the Inn. Together with the German this Swabian-Bavarian high plain forms the German portion of anube basin, an undulating surface averaging 1,600 feet in elevation e Tertiary period this was occupied by the sea which extended the Rhone in France gh the north of Switzer- and across the Alps to ary and Rumania. The ce of the high plain is, ver, only partly com- of sediments deposited t sea; it is in great part ed by material more tly derived from the nes of the huge Alpine rs of the Great Ice Age, extended as far as the latitude of Munich, and by the alluvial its formed by the running water when these glaciers finally melted.

FIG. 136.—*Natural Divisions of Germany.*

he Central Highlands, extending north of the Danube from the thians to the Rhine, exhibit the greatest variety in the direction ir heights and the arrangement of their rocks. One extensive low that of the upper Rhine, is embedded amongst these heights. tructure of the mountains exhibits no recent upridging like the Alps; scarcely anywhere exceed 5,000 feet in height, Schneekoppe, in iesengebirge, alone reaching 5,266 feet. All geological formations are sented like mosaic work, although the Mesozoic, and particularly the sic, preponderate in the South-West German basin, Hesse, and ngia. The strata of the Central Highlands are for the most part nt marine deposits. The most extensive mountain group of the n is that of the North German Rhine Highlands, composed of ian schists, but it is much too small to have been formed on the of an independent division of the sea. Hence it follows that

the scattered portions of the same ancient marine formations, *e.g.*, t Coal Measures appearing on the edge of the Rhine Highlands, Saxony and in Silesia, are connected by continuous strata undergrou or that the once continuous strata have been worn away by denu tion. In fact, the variegated mosaic of this tesselated region can o be understood when one recognises it as a land where the Earth's crust b been dislocated and broken up into blocks—a *Schollenland*. The isola Palæozoic masses show clearly how the Devonian strata of the Rhine, t Hartz, the Frankenwald, and the Sudetes have undergone violent d turbance, being wrinkled into ridges and domes, although the primiti foldings do not figure prominently in the scenery of to-day. The action the encroaching and receding sea and the continual influence of atm spheric erosion have worn the crests away, until only the exceptionally ha rocks of the centre of the folds remain ; a good example of this is seen the quartzite hills of the Hunsrück and Taunus. During the Cretaceo period the sea withdrew, so that Cretaceous formations are found o along the north-eastern edge of the Central Highlands from the Belgi frontier to Silesia. In the course of the Tertiary period the last portio of the land emerged from the sea. Then followed the fracturing a subsidence of the isolated blocks of the Earth's crust, with or withe marginal elevations, and the upwelling of molten rock, as shown by t basalt flows of the Siebengebirge, the Rhön and the Vogelsberg, and al by the little volcanoes of the Eifel, which did not become extinct un Quaternary times. The lines of fracture along which subsidence and t corresponding uptilting have taken place follow three special direction (*a*) From north-west to south-east, the *Hercynian* (so-called from t Hartz) line of strike, marked by the Weser mountains in the north, t Thuringian mountains, the Hartz, the Bohemian Forest, and the Sudet (*b*) From south-west to north-east, as shown by the slate Rhine Hig lands, the Swabian and Franconian Jura, and the Erzgebirge. (*c*) Fro north-north-east to south-south-west, including the Black Forest an Odenwald, the Vosges and the Hardt.

Where the land remains highest as a rule denudation has been mo complete, so that the upper sedimentary layers have been entirely remov exposing the deep foundations of Archæan rocks which now form th summits of the Black Forest, the Vosges, the Brocken dominating th Hartz, and the highest crests of the Erzgebirge and Riesengebirge, all which are composed of granite, gneiss, and mica-schist. In the low grounds the less ancient marine sediments have been more protected fro erosion, and, for example, the Trias, Bunter sandstone, Muschelkalk, an Keuper still remain in the Thuringian Basin, while they have been wor away both from the Hartz, which bounds the basin on the north, and fro the Thuringian and Franconian forests which enclose it on the south. Th existence of patches of Muschelkalk left on the southern Thuringian moun tains proves that the sediment of the Triassic sea had at one time spre

hat district also. In the same way Triassic rocks are still found in wer parts of the Black Forest and also on the Swabian-Franconian ces ; whilst the Swabian-Franconian Jura is named from the Jurassic which at a considerable elevation above the sea rest upon the triple of the Trias. The existence of Jurassic pebbles on the slopes of the ic Feldberg similarly reveals the fact that at one time Triassic and ic strata rested high over the southern part of the Black Forest.

ustal movements have not yet quite died away in the Central German ands. Where the solid mountain mass of the Black Forest with the wald, and the Vosges with the Hardt, is trenched by the Upper Plain earthquake shocks are frequently experienced travelling in the ion of the Rhine, showing that deep within the Earth the vast rift separates these blocks of the crust is still an unhealed wound.

at the present relief of the Central German Highlands is more recent the rivers of the region can be recognised from the fact that the often flow in directions directly opposite to the general elevations of nd, frequently breaking through the highlands in valleys of erosion ated by their own flow. Thus the Weser traverses the Weser chain, hine flows in its gorge across the Rhine Highlands, and the Elbe gh the Bohemian mountain barrier. The Main and the Neckar in their e courses flow between high plains, which are less elevated than the tain crests separating them from the Rhine, into which at one period were enabled to force a passage in consequence of the relation ght having become inverted.

he Northern Plain is the lowest and flattest part of Germany, yet n parts is it a complete low plain. Its foundation consists of de- d blocks of all formations down to the Tertiary, for in the Tertiary l it was still covered by the sea. Even yet a few small island-like ns of the sunken crust-blocks project as hard rocks, such as the chalk of Rügen and a plateau of Muschelkalk near Rüdersdorf, to the east rlin. For the rest the whole plain consists, like the Alpine Foreland, f "real rocks," but of soft material of Quaternary age, mainly sands lays of alluvial and glacial origin. The ice-sheet of the Great Ice which extended from Scandinavia over the German plain has covered t part of the land with the stiff clay of its ground-moraine mixed with ers of ancient formations, the accumulations sometimes forming con- ble eminences. Thus the land is by no means flat or level, although ight rarely exceeds 600 feet. On the melting of the ice, boulders granite and of gneiss carried over from Sweden were left scattered undlings" or erratic blocks over the plain. As the land became free ce the rivers which began to furrow its surface easily washed away ft clay and deposited it in flood-time, forming meadows along the and round the river-mouths.

ow coastal plain extends along the shore of the North Sea, separated he tide-washed beach by a broken chain of sand-dunes. The sea is

encroaching, and has already separated from the land the line of
Frisian islands, which stretch from the Zuider Zee to the unbroken c
of Jutland, and, like the fertile land of the low coast, are still the p
of the devouring ocean. The shallow flats, or "Watten," only uncovere
low tide, merge on the landward side into the "marshes," which, be
a little higher on account of the material washed up by the sea, are
reached by water at high tide. These tracts have been utilised since
Middle Ages, the people protecting them from the sea by constructing
'golden hoop" of dykes or sea-walls. The pastures and corn-fields of
district pass without any orographical difference into the less fruitful
of the sandy diluvium of the "Geest."

Hydrography.—The Central Highlands and the Northern P
belong to the North Sea and Baltic drainage areas, their rivers flow
as a rule in a northerly or north-westerly direction, thus contrasting w
the German Alps and Alpine Foreland, which belong to the Black
drainage area, with the east-flowing Danube as the main river. T
Rhine is the only river which binds southern to northern Germa
crossing the Central Highlands. Its sources rise in Switzerland,
delta forms Holland, yet the main part of its course makes it a Gern
river, and on account of its facilities for navigation, its great wealth
water, and its exceptional depth, the most useful of them all.
summer, when the other rivers, the Danube system excepted, shrink
account of drought, the Rhine is fed by the melting of the Alpine glaci
The system of tributaries on either side of the main stream is develop
with beautiful symmetry, the longest flowing in near the middle of
course where the Mosel describes its great curve from the French slo
of the Vosges, and the Main pursues its zigzag course from the Fichtel
birge. The whole of the South German Highlands except the sou
eastern slopes of the Jura draining to the Danube, sends its rivers to
Rhine. On the contrary, North Germany is shared by several differ
river systems. The small *Ems* and *Weser* in the west are entirely Gern
from source to sea, and so also is the *Oder* in the east with the except
of its actual source in Moravia. Between these the *Elbe* has sunk its re
most deeply into the innermost recesses of the Central European mounta
where it gathers the converging drainage of the Bohemian Basin, and d
charges it into the North Sea. The share of Germany in the Rus
rivers *Vistula* (Weichsel) and *Memel* is but small. Both of th
discharge wholly or in part through great lagoons or "haffs" into t
Baltic. The Oder also discharges through such a lagoon, the Stett
Haff, which is united to the sea by channels between the two isl
of Usedom and Wollin, while the Frisches Haff, into which a branch o
Vistula flows, and the Kurisches Haff, which receives the Memel, are alm
cut off from the sea by narrow spits of sand.

Rivers of the Plain.—All the great rivers of the Northern Pla
have a peculiarity in common. Each receives its longest tributaries o

ght, so that, instead of flowing across the plain in the centre of ainage area, each river runs close to its western watershed. The eastern tributary of the Ems is the Haase, of the Weser the of the Elbe the Havel, of the Oder the Netze, and of the Vistula ug. The sudden change of course from west to north in the at 52° N., in the Vistula at 53° N., is extremely striking. It seem as if the Elbe at one time flowed through the present of the Aller and had received the Weser at Verden. The Oder rly has at one time evidently continued its north-westerly course of Frankfort) and received on its left bank a great stream, pursuing y to the sea at the present mouth of the Elbe. This primitive river have been the Vistula, which then flowed along the southern base of ltic lake plateau. The primitive Vistula then found a way for the me across this elevation down the Oder gorge to the present Stettiner the Elbe taking over its old mouth; a second time, and nearer rce, it found another way across the ridge to the Danziger Haff, by

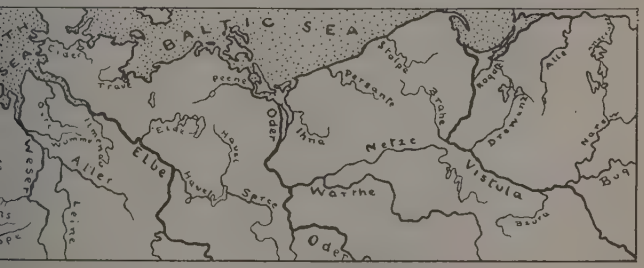

FIG. 137.—*The Rivers of the North German Plain.*

its former tributary, the Oder, was left an independent river with the ed mouth. All these changes were brought about by the influence arth-movements which the crust-blocks, or "buried mountains," enced far into the Quaternary period. In a plain quite small altera- n level suffice to break up the arrangement of river systems and to them to form new combinations. The great deserted valleys are still e us; for example, the valley of the prehistoric Oder is now utilised Friedrich Wilhelm's Canal to unite the Oder and the Spree, and r Berlin the small Spree in the great richly wooded valley of imitive river is as little in harmony with its surroundings as a mouse cage of a lion. Hydrologically, however, all these bendings to the result from the law that rivers, as soon as they have secured a shorter e, leave the earlier one in stagnation, so far as a portion of the earlier e is not taken possession of by a former tributary and thereby restored ivity. The portions of the ancient valley which have become swampy n favourable circumstances been again utilised in order to restore the

prehistoric river-communications and render them available for boats ; the site of the first deviation the Finow Canal now unites the Oder and t Havel, on the site of the second deviation the Bromberger Canal uni the Vistula and the Oder system.

Lakes.—Lakes are most abundant on the most recent geological f mations, the Alpine Foreland and the Northern Plain. The lakes of t *Alpine Foreland* are clearly related to the immense ice-sheet whi descended from the Alps during the Great Ice Age, since the lakes o appear on ground which was once covered by glacier-ice. A few sm lakes lie amongst the mountains themselves, including the charmi Tegernsee and the Königsee in the most southerly corner of Germa The others lie at the northern base of the Alps, including Lakes Starnbe and Ammer south-west of Munich, the broader lake of Chiem between t Inn and Salzburg, and innumerable smaller sheets of water, dwindli to mere pools amongst the ancient moraine mounds.

The *Baltic Lake Plateau* in the north-east of the Northern Plain thickly pitted with small lakes, as its name implies. Many of the cu ously irregular lakes of East Prussia resemble those of Finland, and a of considerable depth. The shallow shore lakes lying behind the cha of dunes on the Pomeranian coast are of quite a different type, identical formation with the Haffs, although the latter are in free communicati with the sea ; thus the Kurisches Haff may be considered the largest la in Germany. The other parts of the Northern Plain are much poorer sheets of water, particularly to the west of the Elbe, where the low-lyi and very flat land, in consequence of the damp climate, has been overgro and its lake basins filled up by the typical vegetation of the moors.

The *Central Highlands* have few lakes ; but in bygone ages many their valleys have been temporarily occupied by sheets of water. T largest is the rift valley of the Upper Rhine Plain, which was a gulf of t sea in Tertiary times, stretching northward from the present Switzerla just as the existing Red Sea (the Erythræan rift valley) stretches northwa from the Indian Ocean. The uplift of the Jura mountains shut off the g and changed it into a lake, which in course of time became filled up sediment from the rivers, and converted into a plain.

Climate.—The mean annual temperature (reduced to sea-level) of t west of Germany is the same as that of the British Islands, while that of t region east of the Oder is similar to the climate of Denmark and the sou of Sweden. The mean annual isotherms cross Germany from north-we to south-east ; in other words, the climate grows colder from the south-we towards the north-east. In summer the zones of temperature correspo more closely with the parallels of latitude, tending to bend northward in t east, because at that season the greater specific heat of the land compa with the sea makes itself most felt on the air temperature in the east, wh the land is widest. Thus the temperature of the air in South Germa in July is higher than 70° F., being equal to that in Central France, wh

rth Germany it is lower than 70° being the same as in England. In
, on the contrary, the south is no warmer than the north in the same
ude; but the east of the country is much colder than the west. In
also the contrast between the high pressure area over the Azores
he low pressure near Iceland is increased, and frequent cyclonic
s sweep over the north-west of Germany. On this account the warm
westerly and westerly winds from the Atlantic blow most frequently
nter, and western Germany consequently enjoys a mild climate,
the east suffers from unbroken frost. The isotherm of 32° F. in
ry enters Germany at the mouth of the Weser, runs southward,
inally curves eastward through Munich. The North Sea coast
rmany remains almost free from frost, while the harbours on the
coast are usually closed by ice, and the further east they lie the
r is their trade arrested, the increasing shallowness and smaller
y of the Baltic conspiring to increase the effects of the colder
r. The water of the Baltic in spring
t rise above the freezing-point until
st of the ice has melted, hence the
g on the Baltic coasts is cold and late.
e Rhine district, when the swallows
and the almond and apricot blossoms
pening, snow is still lying in East
ia, where the frost does not break up
the middle of March. The different
ion of the land necessarily deranges
mplicity of the distribution of tempera-
outlined above. The south-western
and valleys of the Rhine, Mosel,
ar, and Main, are actually the warmest
of the country, enjoying an annual mean temperature of over
, with hot summers and mild winters, because they lie low. On the
hand, the high land of South Germany is in no way more favoured
imate than the northern low plain. Munich and Königsberg have
ame high temperature in July and very nearly the same degree of
in January. High mountains everywhere act as refrigerators for
rrounding districts, and they act most vigorously in summer, when
mperature falls more rapidly than at other seasons with the increase
ight.

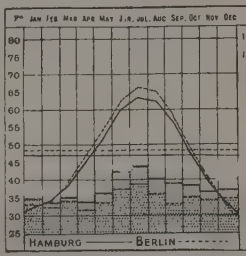

FIG. 138.—*Mean Monthly Temperature and Rainfall Curves for Hamburg and Berlin.*

he mountains similarly receive the heaviest precipitation (on the
ge about, or over, 40 inches per annum) especially on their western
outh-western slopes. The average rainfall for Germany is about 28
s; it is greater in the west, where the moist westerly winds prevail;
here it attains a maximum in July. In most places the rainfall is
d to about 20 inches per annum; in the north-east there are some
with less, while on the North Sea coast it may rise to over 27

inches on account of the moist sea winds blowing upon the rou land (Fig. 53).

Flora and Fauna.—Of the whole area of Germany at the prese time 49 per cent. is cultivated, 20 per cent. consists of natural pasture, per cent. is under forests, and only 5 per cent. can be classed as was land. Thus the original plants and animals of the country can occu only a very small area, the forests even being no longer in a state of natu but under systematic management. Yet the German flora and fauna a extensive enough, including at least 2,250 species of vascular plants a 16,000 species of insects alone. During the Great Ice Age the seve climate reduced the abundant life of the earlier time to a few survivi species strong enough to withstand it. In the Steppe period whi followed, the vacant German lands were invaded from the arid regions the south-east, as far as the Kirghiz steppe, by many species of plants a animals including the Saiga antelope, jerboa, and hamster. The feathe grass (*Stipa*) of the Hungarian and Black Sea steppes also obtained footing in Germany at this period. Almost all the animals peculiar to t Steppe retired again to the east when the climate became moister, and t land once more became wooded, not this time with tropical exuberan but with northern simplicity. The hamster remains in many parts of Ge many a surviving relic of the Steppe period. Most of the present plants a animals result from the post-glacial invasions from the east with whi Germany is so closely connected in soil and climate. Thus there are co paratively few species peculiar to the country; of the 220 species of bir not one is confined to Germany. The larger wild animals, especially t bear and wolf, have been exterminated, and the last bison was killed 1775. The stag, roe, and wild boar still people the forests; the reinde has disappeared since the Middle Ages, but the elk is still found in one the forests of East Prussia. The chamois and marmot are found only the Alps above the tree limit. Reptiles requiring a dry, warm climate a not numerous; all the varieties of lizard and snake known in Germa inhabit the south-west, and scarcely half of the species are found in oth parts of the country. With regard to fish, the Danube district form province of the Black Sea faunal district where no salmon are fou although this fish abounds in the rivers flowing to the North Sea and Baltic. There are numerous oyster banks off the shallow west coast Schleswig, and the only place in German waters where the lobster lives near Helgoland.

Forests.—In order to secure a profitable supply of timber, pine and woods have recently been extended at the cost of the deciduous fore which, consisting mainly of oak and beech, now occupy only one-third the area of German forests. Larch woods are found chiefly in the Al and the beautiful Rolle pine (*Pinus cembra*) grows there only. Proud for of the silver fir (*Edeltanne*) still beautify the Vosges and the Black Fore and are found in places amongst the hills of Thuringia and on the slop

e Sudetes, but they do not occur much further north. The cha-
ristic tree of the Central Highlands is the spruce (*Fichte*), and that of
Northern Plain is the Scots pine (*Kiefer*), which makes up almost half
e German forests, together with the white birch. The beech, which
thrives so splendidly on Rügen and the other Baltic coast lands, is
enly limited by the climate from Königsberg towards the north-east ;
nd this it cannot thrive on account of the increasingly continental
ate reducing the period with a mean day temperature of over 50° F.
ss than five months, although it stands cold in winter better than the
In the north-west, on the contrary, the saltness of the stormy sea
s stunts the growth of trees, and moors and heaths cover that region
h is the least wooded in all Germany. Vine-growing is impossible in
orth-west on account of the damp air and dull skies, but formerly it
carried on in the sunnier regions of the north-east. Now, however,
better means of transport make it unnecessary to grow sour grapes,
German vineyards are mainly found in the valleys of the Rhine and its
taries. On the Alpine Foreland, influenced by the raw Alpine
ate, the vine cannot be cultivated ; in eastern Germany, however, as
orth as latitude 53°, the summer and early autumn are warmer and
cloudy than similar latitudes in the west, and the most northerly vine-
s in the world are those of Bomst, in the province of Posen,
o' N.

erman Races.—Until the commencement of the Christian era the
nan tribes only inhabited the north of Germany, not extending to any
distance west of the Rhine. Then they began to displace or subju-
the Keltic people of the southern half of Central Germany and the left
of the Rhine. In the course of their wanderings the Germans next
possession of the Alpine Foreland and of the Alps. Even to the
ent day the mixture of Keltic blood in South Germany may be
gnised in the large proportion (from 15 to 30 per cent.) of dark-
plexioned and dark-eyed people ; in North Germany fair com-
ons predominate, or at the most brown hair with light-coloured
the proportion with dark complexions scarcely ever reaching 15
cent. When, in the course of their migration, the German
le had deserted the greater part of the eastern half of Central
pe, Slavonic tribes, called by the Germans *Wends*, entered from
ast and spread over northern Germany to Holstein, the Elbe, and
Thuringian Saale. People of the closely-related *Lithuanian* group,
ng from the east, settled themselves in East Prussia from the Vistula
yond the Memel. They included the *Prussians*, whose language be-
extinct about the year 1700, the *Letts*, and in the extreme east to
nd the Russian frontier, the *Lithuanians*, who have still preserved their
ancient language, which in many ways resembles Sanscrit. During
econd half of the Middle Ages the Germans again took possession of
eastern regions. The Slavs were, however, by no means driven out,

but German colonists settled amongst them, gradually introducing the language and customs. So completely has the process of Germanisation been carried out in the districts settled by the early colonists that in most cases the only sign of the Slavonic origin of the peasantry is to be found in the foreign sound of the place-names, which often end in *itz* and *ow*. The Slavonic peoples of north-eastern Germany related to the Poles have completely adopted the German language since their contact and mixing with that people; but the Slavs related to the Chech family have still preserved the remembrance of their original tongue in the Spree valley between Bautzen and Cottbus. It is only in those parts of the country which belonged to the kingdom of Poland up to the eighteenth century that the population continue to speak Polish generally. The *Poles* are not quite three millions in number, and they live chiefly in the provinces of West Prussia, Posen, and south-eastern Silesia; it is they principally who compose the 8 per cent. of German subjects who speak foreign languages. Next to them come about a quarter of a million *French*-speaking inhabitants, mainly in Lorraine, about half as many *Danish*-speaking in northern Schleswig and the same number of Lithuanians.

The chief elements of the present German population are :—

(1) *Swabians* from the Vosges mountains to the river Lech and in the Neckar district (the Germans of Switzerland also belong to this family). (2) *Bavarians* in the whole Danube basin east of the Lech (the Germans of the neighbouring parts of Austria are closely related). (3) *Franks of the Main, i.e.*, the Franks who migrated from the North German Rhine district to the Main valley. (4) *Palatines*, a mixed stock of Franks and Swabians in the Bavarian Palatinate, the south of the grand duchy of Hesse, and northern Baden. (5) *Franks of the Rhine*, in the Rhine province and in Nassau. (6) *Hessians* in the highlands of Hesse. (7) *Thuringians* in Thuringia. (8) *Saxons* extending from Westphalia to the Elbe and to Schleswig-Holstein, also called Low Saxons in contradistinction to the formerly-named Low German or Platt-Deutsch-speaking people. (9) *Frisians*, along the coast of the North Sea and the off-lying islands, formerly speaking Frisian, a dialect distinct from all other varieties of German, but now speaking Low Saxon.

Language.—Where Low Saxons colonised the Slavonic lands on the Baltic coasts and in the Mark Brandenburg, Low German became the spoken language. East Prussia, on the other hand, was colonised by the most different races of North and South Germany after the Order of German Knights had conquered the country in the thirteenth century. Thuringians took the chief part in the Germanisation of Saxony; and Thuringians and Hessians in the settling of Silesia; hence in both these lands Upper German is spoken; indeed, the dialect of the kingdom of Saxony (Upper Saxon or Meissnisch) was promoted in the sixteenth century to be the literary language, or "High German." Upper German was derived in the Middle Ages by phonetic change from the Low

man, once the universal German tongue. It spread from the Swabians Bavarians of the "Upper Lands," who initiated the change, gradually lacing the northern dialects. At the present time Low Saxon only ains unaltered amongst the Frisians, who, to give an example, instead sing the High German *das* and *Wasser*, keep to the old unchanged n of *dat* and *water*, pronounced as in English, and in fact almost tical with the English words *that* and *water*. One of the most re- kable cases is the transitional position of the Franks. The Franks of Main speak with the Upper German value of the consonants, the nks of the Rhine Highlands retain some of the old unaltered words, e those in the Lower Rhine Plain near the Netherlands speak the ent unmodified Frankish dialect.

History.—The territory of the present German Empire (with the ption of the north-eastern provinces, which were added later) formed, ther with the remaining States of Central Europe, the East Frankish pire as it was constituted in 843 out of the Frankish Empire of Charles Great (Charlemagne). The ancient German Empire, however, has been nished by the withdrawal of the territories now belonging to Switzer- , Belgium, and the Netherlands. What remained over fell at last into y hundred powerless fragments—temporal and spiritual principalities, cities, even imperial villages—scarcely held together in a nominal ire. Only two of these practically independent little States attained real importance. One of these was the Bavarian Mark of the sburgs which grew in the Middle Ages into the Austrian Duchy in the h-east; the other was the State of the Hohenzollerns, which spread n the Mark of Brandenburg in the fifteenth century until it occupied, as ssia, the whole of the north-east of the German Plain.

The power of the great Napoleon brought the old German Empire to nd in 1806, shortly after the spiritual principalities (the domains of the ce-Bishops) had been suppressed in favour of the claims of the poral princes. States of the old empire to the number of thirty-nine, later only thirty-five, again came together in the feeble union of the man Confederation (*Deutsche Bund*) which lasted from 1815 to 1866. union terminated with the war of 1866, ch was really a struggle between Prussia and tria for the leadership in the Confederation, led to the definite withdrawal of Austria. s the way was prepared for the new German pire, under the leadership of Prussia, which founded after the united forces of the German es defeated the French attack in 1870.

FIG. 139.—*The German Imperial Standard.*

Government.—The present German Empire strong Confederation of twenty-six sovereign es, each possessing its own independent form of government, but, for common affairs of the empire, all subordinate to the central government.

This government consists of—(1) the Federal Council (*Bundesr*
composed of 58 members representing the constituent States of the emp
(2) the Imperial Diet (*Reichstag*), a popular assem
elected directly by the votes of the whole Ger
people; (3) the Ministers appointed by the Ger
Emperor, who, by the constitution of the em
must be the King of Prussia for the time be
The Emperor is Federal Commander-in-Chief
supreme head of the whole imperial admini
tion; but he is not the monarch of Germany—
authority he exercises is vested in him "in
name of the confederated governments."

FIG. 140.—*The German Flag.*

Division.—In size Germany is the third, in population the sec
country of Europe. The constituent States may be distinguished
North German and South German, as the course of their development
affected by one or the other of the great commercial areas of ce
Europe—the northern depending on maritime trade, the southern on t
over the Alps or by the Danube. South Germany consists of *Bav*
Württemberg, *Baden*, the Reichsland of *Alsace-Lorraine* (administ
directly by the empire through a Statthalter, or governor) and the soutl
part of the grand duchy of *Hesse*, which is not inhabited by Hessians
came under the duchy by inheritance. *Prussia* occupies the lion's s
of North Germany, although the growth of this State towards the west
not begin until 1609, and until 1866 included only the provinces of Rh
land and Westphalia in the west. By the acquisition of Hanover,
Electorate of Hesse and Nassau, including Frankfort-on-the-Main, Pru
was able to unite its older provinces of the east with the hitherto isol
provinces in the west, and so to command a stretch of territory exten
from the Belgian to the Russian frontiers; and, with the exception of
Free Towns, *Hamburg*, *Bremen*, and *Lübeck*, left only three other State
share the German coast—viz., the two grand duchies of *Mecklenburg*,
Oldenburg. The only North German State besides Prussia which is l
enough to contain several million inhabitants is the kingdom of *Sa*
lying close up to the Bohemian border. The fact that North Germ
particularly in Thuringia and in the Weser district, contains no less
twenty of the constituent States of the empire, shows that the north
States have been able to maintain their separate existence better
those in the south.

Religion.—Germany, the cradle of the Reformation, where the s
between Protestants and Roman Catholics first broke out, has continu
be a land of mixed confessions—63 per cent. of the people are Prote
36 per cent. Roman Catholic, and 1 per cent. are Jews. Their distrib
can be clearly explained by historical considerations. Parts of
Prussia, Posen, and southern Silesia form the eastern belt of predo
ating Catholicism in the Oder and Vistula region, the people ha

elonged to Roman Catholic Poland. Beyond this East Prussia is Pro-estant, because the Grand Master of the Order of Knights, the Hohen-ollern Albrecht, who became Duke, took up the cause of the Reformation. The broad middle district of the German Empire is almost throughout Protestant, but in the south-west a strip of Catholic country stretches from Bavaria to the old district of the Bishops of Münster on the Ems; here ne can see to this day the effect of the religious peace of Augsburg in 555 when the dictum was published—*Cujus regio, ejus religio.* Thus where, in those days, the Prince-Bishops ruled on the Rhine, the Mosel, and he Main, and as far as Westphalia, or where the Bavarian Wittelsbacher emained true to the old beliefs, the Catholic ritual is followed to the present day; but in old Württemberg on the Neckar, in the Palatinate, and n Hesse, the Protestant form of worship prevails, because there the princes took up the cause of the Reformation in the sixteenth century. The distribution of the half-million Jews who inhabit Germany may also e explained historically, although in this case social conditions have also o be taken into account. They are confined principally to the districts n the east where there is a large Polish population, and to the south-west n Hesse, the Palatinate, and Swabia; Bavaria contains the smallest num-ber of Jews. The larger number of Jews in Alsace compared with Baden s accounted for by the more favourable laws in the former State during he French period.

The German People.—The density of population is to be explained by economic rather than historic considerations. The average density of population throughout Germany is 250 to the square mile, a figure which is only exceeded amongst the large countries of Europe by Italy and the United Kingdom. The agricultural districts, especially in the Alpine Foreland, the sandy North German plain, and the poor rocky soil of many parts of the Rhine Highlands, of course are much less densely peopled. Yet along the whole course of the Rhine the density of population reaches 250 per square mile, and wherever minerals, especially coal, give rise to flourishing industries, the density approaches 400. This is the case in south-eastern Silesia and on the Waldenburger coal-field to the south-west of Breslau, in the kingdom of Saxony, and especially in the Lower Rhine and Westphalian manufacturing district. With the exception of the Free Towns, Hamburg and Bremen, the most densely peopled State in the world is the kingdom of Saxony with an average density of 658 per square mile, thus surpassing even Belgium.

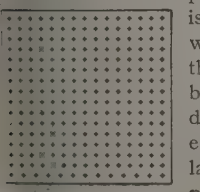

FIG. 141.—*Average population of a square mile of Germany.*

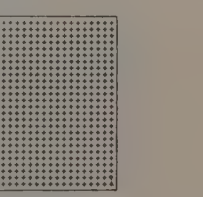

FIG. 142.—*Average population of a square mile of Saxony.*

The German people must be perseveringly laborious, frugal, and th in order to make a living out of the soil of their country, which, altho nowhere too rich, everywhere yields a fair return for hard work. large families of the Germans present a curious contrast to thos other nations, especially of the French. Since 1871, for example, natural increase of population in Germany has been over 11 million, in France only 2 million. The result is considerable emigration f Germany to distant lands, especially to the United States and Br Colonies, where Germans prosper and make good citizens.

The German is not so quick and versatile as the people of the war countries of the south, but his inclement winters have given him a re for the domestic hearth, fostered the family sentiment, encouraged a d of feeling, and habits of contemplation, led to a love for reading and th ing, and to the cultivation of science. Compulsory attendance at sc and, since 1871, the service in the army of every able-bodied young m have exercised a most salutary influence on the intellectual and phy life of the nation. Without being particularly rich, Germany is read make great sacrifices in order to maintain the army and navy in a dition of high excellence for the protection o recently-won position amongst the armed Pow of Europe.

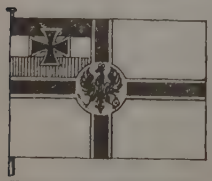

FIG. 143.—*German Naval Ensign.*

Agriculture.—Until the middle of the n teenth century the German lands were almost clusively of agricultural value. This is now case with the north-east only, and even there m centres of manufacturing industry are spring up; and these industries are the most impor interests in the west. Taken as a whole 42 per cent. of the peopl the German Empire are dependent on agriculture, 33 per cent. on ma facturing industries, 8 per cent. on trade, and 3 per cent. on mining the extraction of metals.

The map (Fig. 144) shows the distribution of the more impor branches of agriculture and related industries. The favourable clim conditions of the south-western districts naturally fit them for the exten growth of the vine, hops, and tobacco, and make the Upper Rhine p almost the only part of the country where wheat and barley predomi among the crops. In all other places rye and oats, the chief grain cro Germany, take the first place. With respect to its total production grain-crops Germany is hardly excelled by the more favoured field France, and Russia alone amongst the nations of Europe has a much gr production. But it must be remembered that the warm air and less s oil of France allow far more wheat to be grown there, and that German peasants must, to a large extent, content themselves with bl bread made from rye. The potato was naturalised in all parts of Ger in the eighteenth century; it supplies a cheap form of food, the more v

ble because, like rye, it flourishes on a light soil and in a raw climate. Germany grows more potatoes than any other country, and provides a considerable surplus for export. In the north-east of Germany there are many distilleries for the manufacture of spirits from potatoes; and thus great states dating from the German conquests in feudal times, hitherto nearly useless on account of the sandy soil, have enormously increased in value. More recently this north-eastern region has become the centre of beet growing mainly in connection with the manufacture of sugar, but partly also of distilling. The excessive drinking of spirits which formerly exercised a

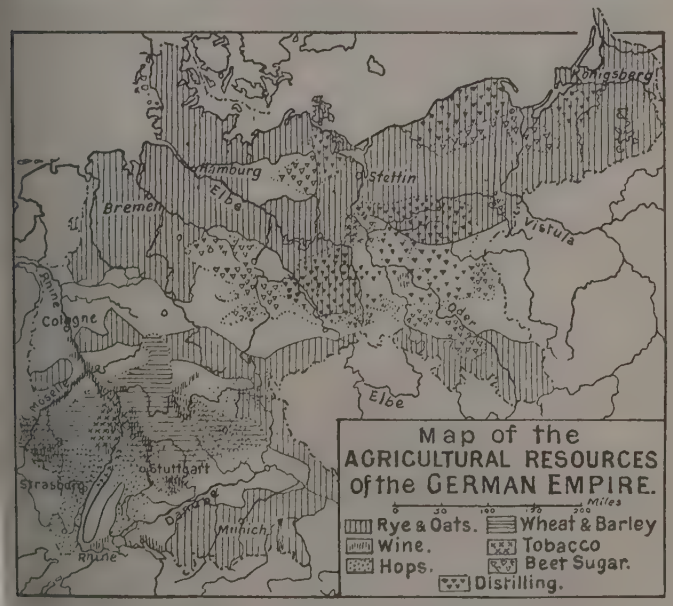

FIG. 144—*Agricultural Map of Germany.*

ad effect on the lower classes in the wineless country of the eastern Elbe , now being remedied by the establishment in all parts of Germany of reweries producing light beer like that of Bavaria. In the excellence and uantity of the beer it produces Bavaria keeps the first place.

The raising of live stock on the extensive pastures and well-cared-for eadows is an important branch of German farming, and Russia alone has larger number of cattle in Europe. The plains of the Alpine Foreland nd of the north are the best for horse-breeding; cattle are kept everyhere for beef and for dairy purposes from the coast marshes to the Alps. he high farming now practised and the fall in the price of wool due to

imports from abroad have recently led to a considerable reduction in number of sheep kept. There are in fact more cattle than sheep in G many, and large flocks are now only to be found on the estates of the g proprietors in the north-east. Goats also are less numerous than forme they are kept in the mountains for their milk, where they have earned name of "the poor man's cow." The number of swine kept, on the ot hand, has increased, mainly on account of the development of the b sugar industry, the refuse from the factories making good food for pigs

The Fisheries along the coasts of the North Sea and the Baltic h been greatly stimulated by the extension of railways opening up inland markets, and a society for artificial fish-culture is actively enga in increasing the number of the more valuable fresh-water fish such trout and salmon.

Industry.—The Germans have been foremost in mining for m centuries, and German miners are now to be found in every continent. many of the mountains of the country, particularly the Erzgebirge, diminution of the output of ore from the old mines has led to development of many forms of domestic industry through the eff of the people to make a living on their native soil. Yet the meth of working and the enterprise of the German miners have brought processes to a high degree of excellence. Almost half of the silver p duced in Europe is raised in Germany, most of it from silver-lead o and the production of zinc, lead, and copper is equally advanced. Th metals are obtained principally from the mountains of Prussia, from neighbourhood of Aachen in the west to upper Silesia in the east. most valuable of the Earth's riches, however, are the supplies of iron- found in almost all parts of Germany, and coal. The most important c fields, which as a rule abound in iron-ore also, occur on the north border of the Rhine Highlands especially in the Ruhr valley, in the ne bourhood of Aachen, to which the Belgian coal-field extends, south of Hunsrück on the Saar, in Saxony, in Silesia near Waldenburg, and in Up Silesia. In the production of coal and iron Germany is far ahead of ev other country on the continent, and is only surpassed by the United K dom amongst European States (Fig. 70). It is besides very rich in rock- and in potassium salts of enormous industrial importance, which accomp the common salt. Almost all the salt-bearing formations are found in sunken mountains under the diluvium covering the North German pl and there a vast supply is stored up for the future.

Brewing, spinning, and weaving were old domestic industries, wood-carving is a national occupation of great antiquity. Domestic in tries have developed on the higher slopes of the mountains where agr ture becomes less profitable ; there the weaving of wool and flax w early favoured by the mountain climate, and wood-carving, lace-mak and, later, glass and porcelain manufacture were established. During nineteenth century the introduction of factories and steam-power has s

way many of the old village workshops, but has brought more lucrative employment to large numbers of working men and women. The most developed of these are the textile industries, now including cotton and silk as well as wool, and the manufacture of iron where the ore and coal are mined together, or can be brought to the same place by steam and railway at small cost. The iron trade alone occupies nearly a quarter of a million workmen. By the quantity and excellence of its manufactures Germany has rapidly distanced all other countries on the continent in the markets of the world, and takes rank next to the United Kingdom. An index of the rapidity of the growth of great industries is afforded by the increasingly rapid migration of people from the country to the towns, and from the small towns to the larger cities. Thus in 1871 there were 8 German towns of over 100,000 inhabitants, together making up rather less than 5 per cent. of the population of the empire ; in 1891 there were 26 of these towns with 9 per cent. of the population, and in 1895 there were 28 with 14 per cent.

Trade.—The external trade of Germany amounts to about $2,000,000,000 per annum, or $40 per head of the population (see Fig. 71). It is that of a typical industrial State, the exports consisting mainly of manufactured articles and the imports of food and raw materials, the proportions being :—

	Food Material.	Animals.	Raw Materials.	Manufactures.	Total.
Imports..	28·4	6·6	58·7	6·3	100·0
Exports..	9·2	—	19·1	71·7	100·0

The principal trade is done with the United Kingdom, then follow the United States, Austria-Hungary, and Russia. The two last-named countries are important for the supply of grain, for Germany itself, even in years of good harvest, does not produce enough food for the population which increases by half a million. The importance of the United States, on the other hand, is mainly for the supply of raw cotton.

The over-sea trade of Germany is carried on by means of a merchant fleet, only second in tonnage to that of the United Kingdom amongst European States. Since 1895 the Kaiser Wilhelm Canal, through Holstein from the Baltic to the estuary of the Elbe, has stimulated German trade by opening a shorter route from the Baltic ports to the Atlantic.

Internal Communications.—The navigable waterways of Germany measure nearly 7,500 miles, of which 1,500 miles are canals. The Rhine is the most important of the navigable rivers ; the Elbe, Oder, and Vistula come next in order. South Germany is poorly supplied with water transport as the Rhine above Mannheim is too rapid for easy navigation, and the Bavarian Danube is not much wider than the Ems ; hence the railways carry most of the traffic between North and South Germany.

The German Empire has the greatest railway system in the world, with the exception of Russia and the United States. There are 29,600 miles of railway, and there is scarcely a point in the empire which cannot be reached within twenty-four hours from Berlin. The capital sunk in these railways is $2,600,000,000 ; and the railways are of more than national im-

portance. The lines along both banks of the Rhine have formed important link in the communication between England and India since St. Gothard tunnel was opened; the line from Strassburg through Mu to Vienna is traversed by the Orient Express from Paris to Constantin while the line from Cologne through Berlin to Warsaw unites Pari the town of Samara on the Volga to Siberia, and thus to the whol eastern Asia. The central position of Berlin in the railway syste Europe is clearly shown in Fig. 54.

Districts and Towns of the Alpine Foreland.—The Ger share of the Alpine Foreland which stretches from the Lake of Const to the Inn, is crossed by the rivers Iller and Lech flowing towards the n and the Isar and Inn towards the north-east, but these rivers are so r that they are only available for floating rafts. The Alpine Forelan prolonged on the north bank of the Danube towards the Fichtelgebirg the Upper Palatinate, which stretches between the Franconian Jura the Bohemian Forest, and is drained by the south-flowing Naab. In Bavarian Alps and the neighbouring parts of the Foreland conife forests and pastures predominate, and the people are principally enga in cattle-rearing. Towards the Danube, however, agriculture prev and the wooden cottages with shingle roofs adapted to an Alpine cli give place to tiled farm-houses. The western or Swabian end of Foreland belongs to the kingdom of Württemberg as far as the Iller; at the point where that river enters the Danube at the commencemer navigation, the city of *Ulm* stands on the left bank. It is renowned fo splendid cathedral, and is besides an ancient commercial town at the of the most convenient passage between the Danube valley through Franconian Jura to an eastern tributary of the Neckar. Between the and Lech lies the Swabian district of the kingdom of Bavaria. *Augsb* the former chief town of the Alpine Foreland, stands on the Lech. dates from Roman times, and remained a very important comme centre until the fifteenth century, on account of the Oriental g

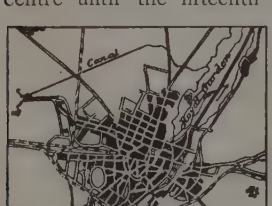

FIG. 145.—*Munich.*

brought over the Alpine passes from I and down the Lech valley. The road fo at Augsburg westward to Ulm and no ward through the Franconian Jura. eastern portion of the Foreland is the orig country of **Bavaria**, which became a k dom in 1806 and secured as an exten the Swabian district as well as the three tricts of Franconia in the basin of the M

Munich (*München*), on the Isar, has gr up since the thirteenth century, and ceeded Augsburg as the royal reside The kings have beautified the city by the erection of many fine bu ings, and made it the centre of South German art, especially paint

d of art industries. It is the greatest beer-brewing town in the world, d the chief grain market for the non-agricultural region of the varian plateau and the Bavarian Alps ; but, above all, it has a great ure as a commercial centre on account of the railways converging it from the north, from the south over the Brenner Pass and down the n valley, from Paris on the west and Vienna on the east. The lack of al in the Alpine Foreland has restricted manufactures. *Regensburg atisbon*), the old residence of the Dukes of Bavaria, stands on the nube at the most northerly point reached by that river, where in the rly Middle Ages the incoming Bavarians first encountered it as they ne from Bohemia, and where in antiquity the Romans erected a fort ainst the independent German tribes.

South-West German Districts and Towns.—"The Garden of rmany" is the name fondly given to the rich, flat plain of the Upper Rhine, low with varied agriculture, and framed by the finely wooded ranges of e Vosges and Black Forest. Behind these bordering ranges of ancient ck there follow stretches of Triassic and Jurassic formations. The stern flank of the system belongs entirely to Germany, and includes the abian-Franconian Jura, a limestone plateau with an abrupt slope down- rds on the side towards the Rhine, crowned by prominent castles, such those of Hohenzollern and Hohenstaufen, and merging into the abian-Franconian terrace region through which the Main and Neckar w. The western flank extends into France ; here the boundary strips nibit a striking section where, on the right of the Mosel in German rraine, the Jurassic rocks remain above the Triassic.

The Rhine receives almost all the streams of the south-west German sin ; the Neckar and Main, the chief rivers of the eastern flank, have t their way through the Central Highlands to the middle Rhine plain, d on the western flank the Mosel, flowing from the southern Vosges like twin of the Neckar, describes a wide arc and returns to the Rhine rough the gorges of the Rhine Highlands.

Until the South German States extended their territory under poleon's influence the State of **Württemberg** was confined to the abian portion of the Neckar basin. It became a kingdom at the ne time as Bavaria, and its capital, *Stuttgart*, has recently acquired nsiderable importance. It is situated amidst charming scenery on the side of the Neckar, and prospers on account of the cheap transport of v materials and coal by the Neckar valley railway from the Rhine, abling it to become an industrial centre particularly for engine-con- uction and cotton-weaving. It is also the chief centre of the South rman printing and publishing trade. In Bavarian Franconia two cient episcopal cities stand in the valley of the Main, the only large er in Germany which flows westward. These are *Bamberg*, on the dnitz close to its confluence with the Main, and *Wurzburg*, a larger town the Main itself where the river cuts its zigzag course almost in the

shape of a **W** into the Muschelkalk of the Triassic Franconian plat
Nürnberg (*Nuremberg*), on the Pegnitz, an eastern tributary of the Red
is nearly twice as large. It was founded in the eleventh century
barren ground under the protection of an imperial castle ; then, thro
the energy of its citizens, it acquired the rank of a self-governing "F
Imperial Town," and became the most famous centre of industry
invention in Germany during the Middle Ages. Now it has again bec
a busy industrial town, and a great centre of commerce on the rail
which runs through it directly northwards from Augsburg to Er
Nürnberg is a gem among the towns of Germany on account of
perfection in which its ancient buildings have been preserved,
especially for its noble Gothic churches.

Frankfort-on-the-Main is on the threshold of North Germany,
has grown into the greatest of all the towns of the Main valley.
Vienna it stands on a point where two routes cross at right angles ;
east to west route following the Main valley being cut by the nort
south route from the Upper Rhine plain to the north coast. It was
true centre of the earliest development of German culture in the Rh
valley, and in many respects the chief town of the old German Emp
It has always been a place of civic affairs, and of high intellectual acti
—it is the birthplace of Goethe. Since 1866 it has been attached to
new Prussian province of Hesse-Nassau, and now, by the deepening of
lower channel of the Main, Frankfort is practically one of the Rhine ri
ports, and one of the foremost trading and banking centres of the wes
Germany. The southern part of **Hesse,** formerly belonging to
Electoral Palatinate, contains *Darmstadt*, the capital of the grand duchy
the base of the Odenwald, and *Mainz* (*Mayence*), a fortress on the bend
the Rhine towards the north-west and the most important crossing-pl
of the Middle Rhine. The Bavarian Palatinate lies entirely on the lef
the Rhine, enriched by the generous vineyards of the eastern slope of
Hardt. Finally, the northern portion of the grand duchy of **Bad**
contains *Heidelberg* at the point where the Neckar enters the plain ;
old capital of the Elector Palatine is dominated by the magnific
ruins of an ancient castle destroyed by
French in 1689. The later capital, *Ma*
heim, is an entirely modern town at the c
fluence of the Neckar and the Rhine,
carrying on an active trade on the gr
river. The present boundaries of Ba
date only from the nineteenth century.
capital, *Carlsruhe*, was built in 1715 at
command of the Prince round a hunt
castle, from which, as a centre, the strai
main streets radiate. *Konstanz* (*Constantia*, *Constance*), on the other hand,
been a town since the time of the Romans, and was an episcopal city

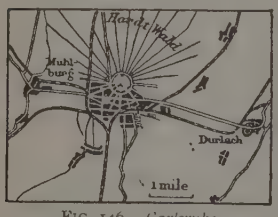

FIG. 146.—*Carlsruhe.*

Middle Ages; it is the only town of Baden on the left bank of the ine, being situated at the point where the Untersee unites with the Lake Constance.

The imperial territory of **Alsace-Lorraine,** re-taken from the French 1870, is made up of Alsace on the slopes of the Vosges draining directly o the Rhine, and Lorraine in the Mosel district; the former is inhabited people of Swabian and the latter of Rhenish-Franconian stock so far as y were not occupied by the later immigration of Romanised Kelts. *assburg*, the capital of Alsace-Lorraine, is a very important traffic-centre l a strong fortress, because it lies almost in a straight line between the ley of the Zorn by which the route from Paris crosses the Vosges, and valley of the Kinzig which leads across the Black Forest to the source he Danube (see Fig. 48). *Mühlhausen*, in the south of Alsace, is the most portant cotton manufacturing town of southern Germany. The strong tress of *Metz* protects the Mosel valley, which forms the most natural e of communication between France and Germany. It was the ancient ital of the Keltic Mediomatriker.

The Rhine Highlands and their Towns.—This division of the ntry presents an undulating surface little over 1,500 feet above sea-el, forming the worn-down residue of a mountain range now presenting eniform outline, the indentation being represented by the low plain of logne towards the north-west. The Rhine flows across this plateau in a rge towards the north-west, which is most contracted between Bingen to small volcanic mountain group of the Siebengebirge opposite Bonn e eastern wing of the Slate Highlands is divided by the Mosel valley into Hunsrück on the south and the Eifel on the north; the right wing is led the Taunus as far as the Lahn, the Westerwald as far as the Sieg, Sauerland as far as the Ruhr, and the Haar to the north of that river. e plateaux between those valleys of the Rhine system have for the most t an inclement climate and infertile soil; in the Eifel there are ex-sive moorlands on account of the amount of clay present forming an pervious soil; other parts bear extensive forests. The deeply cut leys, on the contrary, are extremely fertile because of their sheltered sition and productive alluvial or loess soil. Here in the Rheingau at the e of the Taunus and on the slopes of the steep slate banks of the Rhine l Mosel, frequently crowned by the ruins of ancient castles, the best nes of Germany are grown. Here also, close to the thinly peopled teaux untouched by trade, is one of the most thickly peopled and siest districts of the country, the river itself traversed by a ceaseless eam of passenger and cargo steamers, and railways following both nks through the gorges. The pulse of traffic beats less strongly in the ral valleys, but recently a railway of great importance for strategic poses has been constructed along the valleys of the Lahn and Mosel nnecting Metz with Berlin. The whole is now Prussian, the greater t being included in the Rhine Province inhabited by people of the

Rhenish-Franconian stock ; only the Taunus and the Rheingau belon the new province of Hesse-Nassau, and the north-east of Sauerland Ruhr district) to the Low Saxon province of Westphalia. On the left of the Rhine, once occupied by the Romans, there are towns w history goes back for more than a thousand years. *Trier* (*Trèves*) once the chief town of the Keltic Treverer ; it stands in a widening o Mosel valley and was often the residence of the Roman emperors, made it an outpost against the attacks of the German tribes.

Other ancient towns are *Bingen*, the university city of *Bonn*, and in the centre of the Slate Highlands *Coblentz* (*i.e.*, *Confluence*), at the m of the Mosel, the capital of the Rhine province, and strongly fortifie order to protect the valley of the Rhine from an attack by way of Mosel. *Aachen* (*Aix-la-Chapelle*), at the northern base of the Eifel, st on a coal and iron field, the only great industrial town of Germany, w is at the same time celebrated for its baths, its warm springs havin fact given it its name f the Latin *Aquæ*. charming bathing-plac *Wiesbaden*, in a shelt spot at the base of Taunus, has also been brated for its baths s Roman times.

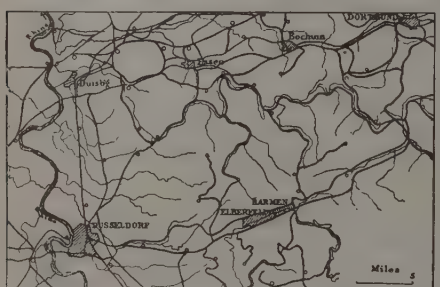

FIG. 147.—*The Railways of the Ruhr Coal-field.*

Thanks to the metal duction, and principall the iron of Sauerland the neighbourhood of Ruhr coal-field, a swarm of industrial towns has grown up, including on and near the Wup the con iguous towns of *Elberfeld* and *Barmen*, engaged in textile industr *Solingen* and *Remscheid*, with iron and steel manufactures ; and nort the Ruhr valley, *Essen*, with Krupp's famous cast steel works, and fur east *Dortmund*, a centre of iron and coal mining on the edge of the H and the seat of a great iron industry, particularly the construction machinery.

The Hessian Uplands.—The narrow Hesse and Weser Upla lying east of the Rhine Highlands, are unified by the Weser river sys but fall naturally into two divisions. That of Hesse to the south is hig with masses of hard basalt standing out from the prevailing Tria rocks and forming the highest parts of the district in the Vogelsb (2,533 feet) and the Rhön mountain (3,146 feet). The river F rises in the Rhön, and unites at Münden (*i.e.*, mouth, called after confluence) with the Weser, which flows from the south-western slop the Thüringerwald, and is called as far as Münden by the Upper Ger dialect name of Werra. The Eder flows east to the Fulda from the slo

ne Rhine Highlands, and the Diemel north-east to the Weser below den. Being without mineral wealth Hesse has perforce developed as rely agricultural district; until the thirteenth century it could only t of small villages, and even yet there are scarcely any but small ket towns. The two famous mediæval abbey-towns of *Fulda* and *feld* stand on the Fulda; and lower down the same river *Kassel*, the al of the Prussian province of Hesse-Nassau, is built on a fertile ex- ion of the valley, an important meeting-place of traffic from the h and south, and from Thuringia on the east. The flat dome-like s of the Vogelsberg, together with the fruit-growing plain of the terau stretching from the bed of the Lahn at Giessen to Frankfort- ne-Main, forms the North German half of the grand duchy of Hesse. Principality of **Waldeck** stretches from the Eder to the Diemel of Kassel.

The Weser Uplands.—The varied scenery of the Weser Uplands, cely any parts of which exceed 1,500 feet in elevation, is formed almost rely of Mesozoic sedimentary rocks. It consists mainly of fairly ipt and finely wooded hills which pleasantly break the monotony of flat fields and meadows on either side of the Weser. In the north e are two long narrow mountain ridges, the Teutoburger Wald and Weser chain converging towards it and cut through by the Weser in *Porta Westfalica*. There is no natural centre for the growth of a n, but the Low Saxon people have always combined their farming other work, particularly with weaving, and recently the utilisation of lies of coal, both of Carboniferous and of Cretaceous age, has led to dvance in industrial enterprise. *Bielefeld*, renowned from an early od for the fine linen it produces, is in the Prussian province of West- ia, at a remarkable gap in the Teutoburger Wald which gives passage ne railway from Cologne to Minden. Most of the rest of this region ngs to the Prussian province of Hanover. The university town of *ingen*, in the south, stands on the Leine, which flows out of Thuringia, runs parallel to the Weser, reaching the northern plain before it joins Aller, a tributary of the Weser. In the north of the province of over there are two interesting old episcopal cities: *Hildesheim*, on Innerste, which flows from the Hartz plateau to the Leine, a town se quaint architecture has won for it the name of "the North German nberg," and *Osnabrück* lying between the converging spurs of the er chain and Teutoburger Wald in the west, now the seat of varied stries in consequence of the recent discovery of coal. The two parts ne province of Hanover are almost completely separated by a series of l States running east and west, including the principality of **Lippe** veen the Weser and the Teutoburger Wald, with its capital *Detmold;* a narrow strip of the territory of Brunswick (*Braunschweig*) from the er to the Hartz, and north-east of the *Porta Westfalica*, the principality **chaumburg-Lippe,** one of the smallest States in Germany.

Thuringia and the Hartz.—The Thuringian basin lies betw
the elliptical plateau of the Hartz on the north and the Thüringer
which runs north-westward as a mountain ridge from the platea
the Frankenwald dominated by the Fichtelgebirge. It is a comparati
low district of Triassic formation covered in great part by cultivated fi
contrasting with the bare ancient rocks and old forests of the borde
highlands which rise in places to over 3,000 feet (the Brocken 3,740
in elevation, too high for profitable agriculture. The Hartz contains g
mineral wealth, its mines yielding large quantities of iron, lead, silver,
copper ore ; while the Thüringerwald and Frankenwald are noted for
variety of their industries, amongst which the manufacture of glass
porcelain and wood-carving are pre-eminent. In the Thuringian b
also there is a good deal of small industry, although with the exceptio
salt there are no useful minerals, and farming is the chief occupatio
the people. Northern Thuringia and part of the Hartz, including
Brocken, belong to the Prussian province of Saxony. *Erfurt*, the m
polis of Thuringia, is an important traffic centre on the east-and-
artery of trade formed by the Thuringian railway between Eisenach
Halle. *Halle-a-S.* (*i.e.*, Halle on the Saale, the river which rises in
Fichtelgebirge and receives on the left the chief Thuringian stream,
Unstrutt) has recently outstripped Erfurt in the growth of populatio
account of its fine commercial situation in the south-eastern "bay" of
North German plain, and to the promotion of manufactures on a l
scale by the presence in the neighbourhood of large deposits of Ter
lignite. On account of the frequent divisions of inheritance amongst
branches of the Saxon Ernestine family, the south of Thuringia forn
mosaic of small States, which are grouped into about a dozen a
scattered over the district. The grand duchy of **Weimar** is made
of two parts, one containing *Weimar* to the east of Erfurt, the o
Eisenach with the old castle of the Wartburg, celebrated throughout
world for its associations with Luther, finely situated at the north-wes
end of the Thüringerwald. **Coburg-Gotha** is a double State made u
two separate parts—the Thuringian duchy surrounding *Gotha*, betw
Eisenach and Erfurt, and the Franconian duchy, containing *Coburg*, in
drainage area of the Main. **Meiningen** stretches from the Werra va
in which its capital *Meiningen* stands, to the Frankenwald, where *Sonnen*
is the greatest doll-making town in the world, and as far as the u
Saale. **Altenburg** shares part of the Saale valley near the border
Meiningen, and a separate portion farther east where the capital *Altenb*
is situated, near the Pleisse to the south of Leipzig. There are two o
pairs of little States not of the Ernestine group, but also made up
scattered bits of territory, **Schwarzburg-Rudolstadt** with *Rudolstad*
the Saale, where the beautiful Schwartzathal opens ; **Schwarzbu**
Sondershausen with *Sondershausen*, entirely surrounded by Prus
territory to the north of Erfurt ; **Reuss** of the older line, with *Greiz* on

ter, and **Reuss** of the younger line, with the industrial town of *Gera* her down the same river.

The Kingdom of Saxony.—The kingdom of Saxony with the ine of a right-angled triangle, lies close to the east of Thuringia. e Erzgebirge which rise steeply from Bohemia sink gradually in the n of a plateau towards the north-west on the Saxon side, down which two Mulde rivers flow to unite on the fertile loess-covered plain pass onwards to the Elbe. The highest summit of the Erzgebirge, ch run north-eastwards from the Fichtelgebirge, is the Keilberg, 4,052 . The granitic plateau of Lausitz lies at the eastern angle of Saxony in line of the south-east running Sudetes. Between these ranges the e breaks through from Bohemia, and with its tributaries has cut up a teau of Cretaceous sandstone into a series of miniature table-topped untains of great picturesqueness, which have been termed the Bohemian- on Switzerland. The Elbe, a navigable river before it leaves Bohemia, ws in a north-westerly direction across the fertile and in some parts e-clad Saxon lands. The capital, *Dresden*, stands on both sides of the er in a beautiful expansion of the valley. Its collected art treasures and e architecture have won for it the name of "the Florence of the Elbe"; it has recently become a great industrial and commercial town as well. e somewhat more populous city of *Leipzig*, at the confluence of the ter and the Pleisse, stands at the north-western angle of the kingdom, its sition in the south-western "bay" of the North German plain corre- onding to that of Halle. Hence it is the natural objective for warlike vements or peaceful commerce coming from the north-east and keep- g as long as possible on the plain, or coming from the south-west with design of reaching the low ground as rapidly as possible. Thus, next Berlin, Leipzig is the most important inland trade centre of Germany, l consequently it has become a great industrial town also. It is the ef seat of the German book trade. The most productive coal basin of ony stretches over the Mulde district between the great manufacturing ns of *Zwickau* and *Chemnitz*. On the poor, forest-clad soil of the zgebirge, the inhabitants, like those of the Thüringerwald, maintain mselves by a variety of domestic industries such as lace-making, and ough their diligence and frugality have attained a greater density population than the agricultural people of the fruit-bearing lands ng the northern border.

The Sudetes.—The Sudetic mountain system is composed of moun- n ridges and plateaux of Hercynian strike. It separates the drainage as of the Bohemian Elbe and the Moravian March from that of the er, which flows through the "Moravian Gate" (a gap less than 1,000 t in elevation between the Sudetes and the Carpathians) in a curve ards North Germany, and receives on its course north-westwards ugh Silesia tributaries flowing north-eastward from the eastern etes and those flowing northward from the western end of the range.

The range runs next rather to the east-south-east, the Lausitzer mounta from the edge of the plateau towards Bohemia, and on the other side the deep valley of the upper Neossa come the Iser mountains and th immediate continuation, the Riesengebirge, at the east end of which, not from Schneekoppe, the most important and central pass of the Sude leads from Landshut in the Silesian Bober valley to Bohemia. Finall follows the irregularly grouped Waldenburger hills and the two clos approaching terminal members of the whole system with a due sou easterly direction, enclosing the rectangular mountain basin of Glatz of which the Neisse flows north-eastwards through a deep and narr gorge, and the similarly formed but wider plateau-like depression wh gives birth to the Oder. Many of the summits of the Riesengebi exceed 5,000 feet, and the Altvater in the Gesenke reaches 4, feet, heights not found elsewhere in Germany except in the Alps. T whole crest of the Riesengebirge, averaging 4,250 feet in height, r above the forest limit and is covered only with bushy mountain pine. T high-stemmed coniferous forests belong as a rule to the upper mount slopes, and are mixed with deciduous trees lower down. The hot summ of eastern Europe allow of agriculture being practised up to 3,000 f and the juicy mountain pastures are favourable for cattle-rearing; on Riesengebirge the Alpine method of cattle farming prevails, and form large flocks of sheep were kept. The wool produced on the spot and excellent mountain flax supply the materials for an active domestic weav industry which has been long established; and recently textile factor including those for cotton, have developed, and are supported by charcoal made in the forests. The abundance of timber and the ra currents of the mountain streams have led to the establishment of m saw-mills, and glass-making has also been introduced from Bohem Thus the whole of this mountain region is thickly peopled, but altho the villages of weavers stretch for miles along the valleys there are large towns. Since the three Silesian wars of Frederick the Great alm the half of the Sudetes have belonged to Prussia, and with the plain the Oder forms the province of Silesia (*Schlesien*).

The North German Low Plain.—The north of Germany characterised by open plains with, at most, an undulating surface, and divided up by the numerous streams and rivers which have frequen cut steep-sided valleys through the gently swelling elevations. The m charming features of the landscape in the plain are the small la with their fringe of reeds and the white and yellow water-lilies mirro in the placid surface. These are most numerous on the Baltic ridge south of it in Brandenburg; in Posen they disappear as the base of mountains is approached, but there fertile stretches of loess are mi with the otherwise sandy soil, and pine forests take the place of deciduous woods, while wheat, barley, and sugar-beet are cultivat Deciduous forests, however, do not entirely fail to grace the ot

ons; Oldenburg itself boasts some fine oak woods, and the most terly coast lands of the Baltic rejoice in magnificent beech forests. sandier the soil grows towards the east the more monotonous do pine woods become, relieved only by the silvery bark of the birch. ut one-third of the surface is covered by such woods, the rest being upied by sheep pastures and fields of rye, oats and potatoes. The eburg Heath extending west from the Elbe to the Aller, is covered heather and now has many oases of tree plantations. Beyond it the nery becomes more and more like that of the neighbouring country Holland, quite flat and sterile, with wide moors on account of the of natural drainage; the smell of peat fills the air, windmills are minent features, and the Frisian cattle graze on the rich marsh dows behind the protecting sea-walls on the North Sea coast. mains of the row of North Sea dunes are only to be found along the ner coast line of the Continent long since worn away and represented by the line of Frisian islands, while sand-dunes run along the Baltic st in place of marsh lands. The only rocky island in the North Sea nging to Germany is the sandstone islet of Helgoland, lying off the uth of the Elbe, which was held as a British possession from 1807 to 1890.

Political Divisions of the Plain.—The North German low plain politically much more homogeneous than the rest of the empire. ides the three Free Towns—Lübeck, Hamburg, and Bremen—the nd duchy of **Mecklenburg-Schwerin** stretches from the lower e to Pomerania containing the pretty capital *Schwerin* on a lake of same name, flanked on east and west by the two unequal divisions the smaller grand duchy of **Mecklenburg-Strelitz.** The duchy **Anhalt** extends in the south across the province of Saxony from the tz eastward, with the capital *Dessau* on the lower Mulde. In the north he Hartz lies the main portion of the duchy of **Brunswick,** with capital *Brunswick* (*Braunschweig*) on both sides of the little river Oker ch flows from the Hartz to the Aller. Finally, the grand duchy of **denburg** extends from the Jade Gulf and the lower Weser southward the interior. Its capital, *Oldenburg*, stands on the Hunte, a left-bank utary of the Weser; other portions of this duchy are detached from main body. All the rest of North Germany is made up of provinces of kingdom of **Prussia.** East Prussia extends from the Frisches to the isches Haff and the Russian frontier, with *Königsberg* just above the uth of the Pregel in the Frisches Haft. West Prussia lies on both sides ne Vistula, with *Danzig* at the mouth of that river as its chief town, and h of it comes the province of Posen with the capital *Posen* on the rte, the chief right-bank tributary of the Oder. Silesia is the fourth ssian province touching the Russian frontier, and has *Breslau* as its tal. Brandenburg, historically the nucleus of the kingdom of Prussia, between Mecklenburg and the kingdom of Saxony and between the te and Oder and the Elbe with its tributary the Havel. At

Spandau, the westerly fort protecting Berlin, the Havel receives tributary the Spree. The province of Saxony lies on both sides of Elbe, and its capital, *Magdeburg*, stands on that river. Schleswig-Holste in the south of Jutland, has as its capital *Schleswig*, on one of the lo narrow inlets which penetrate the land from the Baltic shore. Hano extends to the Teutoburger Wald and the frontier of the Netherlands, w its capital *Hanover* on the Leine ; and Westphalia (with *Münster* in "bay" of the plain between the Teutoburger Wald and the Haar) and Rhine Province on both sides of the river before it leaves Germany, co plete the divisions of Prussia.

Chief Coast Towns. -The two great naval stations of Germany *Wilhelmshaven* on Jade Bay on the North Sea, and *Kiel* on the inlet of same name near the Baltic entrance of the Kaiser-Wilhelm Canal, wh enables German war vessels to pass rapidly from one sea to the other a concentrate at any desired point on either coast. In the extreme e *Königsberg* belongs to the group of towns that have prospered throu over-sea trade, although on account of the shallowness of the Frisc Haff large vessels cannot reach the harbour, and the outport of *Pillau* the sand-spit enclosing the lagoon has been built to carry on the tra The navigable Pregel enables Königsberg to serve as a centre for tributing goods through the interior of East Prussia, and in winter wh the Russian harbours are frozen up, there is great traffic by railway to Baltic provinces of Russia. *Danzig* is not only the great commer centre of West Prussia, but is important as the seaport of Russian Pola exporting the wood and wheat brought down the Vistula. *Stettin* similarly not only the chief seaport of Pomerania but of an extens hinterland, even to a certain extent serving as the Baltic port of Ber since it is the most southerly point which sea-going vessels can reach fr the Baltic, and the navigable Oder is linked by canals to all parts northern Germany, including the Elbe system. *Lübeck*, on the Tra which falls into the head of the Baltic bay, which reaches farthest to south-west, has since time of the Hanse League been a favou centre for Baltic trad

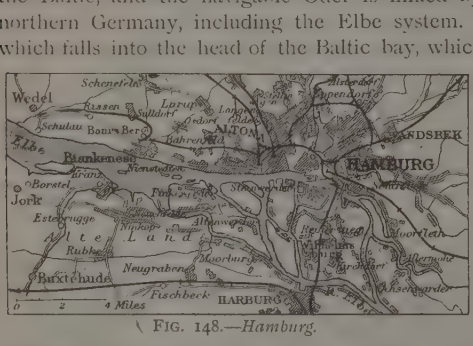

FIG. 148.—*Hamburg.*

On the North coast the ports are small *Emden* at mouth of the Ems, the great harbou Bremen and Hambu which in happy riv command the whole German trade with America. *Bremen* has recently been made accessible to the largest sea-going vessels by deepening of the lower Weser ; but *Hamburg* receives the greater sh

he trade on account of its situation on the most south-easterly inlet of North Sea where the Elbe allows of easy anchorage for ships of any ught, and because of the cheap water-transport by which goods can be varded to the interior of the country ; so it has become the greatest port on the continent of Europe, and now realises the benefits of being longer separated from the rest of the country by a Customs barrier. large town *Altona*, in Schleswig-Holstein, shares the favourable ation of Hamburg, and is now united with it by continuous streets.

Inland Towns of the North German Low Plain.—Within ent years the coal-fields of the Ruhr valley have enabled many of the ns of the lower Rhine district to become great manufacturing centres. h in particular are *Krefeld*, some distance from the left bank of the ne, which is now the chief silk manufacturing town in Germany, and *seldorf*, the splendid river-port on the right bank of the Rhine, in close way communication with the neighbouring Barmen and Elberfeld Fig. 147) and celebrated also for its Academy of Painting. In the inland le between east and west, Cologne, Hanover, Brunswick, Magdeburg, nkfort-on-the-Oder, and Posen have all in- ased in importance on account of their tion at the crossing places of important rs. *Cologne* (*Köln*), with its lordly cathedral, aturally the most important of the series, for going vessels can reach it easily from Rotter- , thus it is a place for transhipping cargo of immense activity on account of the great h and south river highway of the west cross- the greatest east and west railway of the h. Cologne is very strongly fortified on this ount, and so are Magdeburg, the chief centre of the German beet-sugar le, and Posen, which lies on the central line of approach from Russia ards Berlin. Breslau also, the true centre of Silesia, became important n its position at a crossing of trade routes, the roads from Bohemia ough the Landeshut Pass, and from the March through Glatz, meet e and cross the Oder in the direction of Posen.

FIG. 149.—*Cologne.*

Berlin.—Berlin has grown as the seat of the Hohenzollerns in the tre of Mark Brandenburg, increasing in importance with the growing ver of the Brandenburg-Prussian state. Its position on the Spree has sted its development as a commercial town from an early period : even he thirteenth century it shipped wheat to Hamburg, and now, by means anals from the Spree and Havel to the Oder, goods can be carried cheapiy r the whole Elbe and Oder river systems, a very important consideration the supply of food and fuel to the city. The full advantages of situation appeared in the nineteenth century, when the level stretches of the h-east plain, equidistant between the coast and the highlands, developed stem of direct lines of communication with Hamburg and Breslau, with

the Halle-Leipzig lowland "bay" and Stettin. Thus Berlin naturally came the greatest centre of radiating railway lines in Central Europe, direct touch with every capital on the Continent (see Fig. 54), a huge co mercial city, the head-quarters of German banking, and one of the ch industrial towns of Europe, especially for the manufacture of clothing a artistic articles, in fact, half the population live by its manufactur Frederick the Great made Berlin a leading town in the scientific a artistic world, a position it has since maintained and improved. Includ the suburbs and the inseparable town of *Charlottenburg* on the west, t total population of Berlin is at least 2,000,000, making it second in s only to Paris amongst the cities of continental Europe.

FIG. 150.—*The Surroundings of Berlin.*

STATISTICS.

AREA AND POPULATION OF THE GERMAN STATES.

State.	Style.	Area in sq. miles.	Population. In 1890. Number.	per sq. mile.	In 1900. Number.	per
Prussia (including Hafls) ..	Kingdom ..	136,116	29,957,367	223	34.472.509	
Bavaria	„ ..	29,291	5,594,982	191	6,176,057	
Württemburg	„ ..	7,535	2,036,522	270	2.169.480	
Baden	Grand Duchy ..	5,822	1,657,867	285	1.867.944	
Saxony	Kingdom ..	5,789	3.502.684	605	4.202 216	
Alsace-Lorraine	Imperial Territory	5,500	1,603,506	286	1 719.470	
Mecklenburg-Schwerin ..	Grand Duchy ..	5.135	578,342	113	607.770	
Hesse	„ ..	2,966	992,883	335	1,119,893	
Oldenburg	„ ..	2.481	354,968	143	399.180	
Brunswick	Duchy ..	1,418	403,773	283	464.333	
Saxe Weimar	Grand Duchy ..	1,396	326,091	235	362.873	
Mecklenburg-Strelitz ..	„ ..	1,131	97,978	87	102.602	
Saxe Meiningen	Duchy	953	223,832	235	250.731	
Anhalt	„	906	271,963	300	316.085	
Saxe Coburg-Gotha ..	„	756	206,513	273	229.550	
Saxe Altenburg	„	511	170,864	332	194.914	

AREA AND POPULATION OF THE GERMAN STATES—(*continued*).

State.	Style.	Area in sq. miles.	Population. In 1890. Number.	In 1890. per sq. mile.	In 1900. Number.	In 1900. per sq. mile.
..k	Principality ..	469	128,495	274	138,952	296
ck	„	433	57,281	132	59,918	133
zburg-Rudolstadt ..	„	363	85,863	236	93,059	255
zburg-Sondershausen	„	333	75,510	227	80,898	242
younger line ..	„	319	119,811	376	139,210	435
rg	Free Town ..	158	622,530	3,949	768,349	4,862
nburg Lippe.. ..	Principality ..	131	39,103	299	43,132	329
older line	„	122	62,754	514	68,396	559
.. .. ..	Free Town ..	115	76,485	665	96,775	841
n	„	99	180,443	1,823	224,882	2,269
erman Empire		210,248	49,428,470	236	56,367,178	269

POPULATION OF THE LARGEST GERMAN TOWNS.

	1890.	1900.		1890.	1900.
.. .. ..	1,578,794	1,888,326	Elberfeld	93,538	156,937
rg	569,260	705,738	Bremen	125,684	156,718
n (München) ..	349,024	499,959	Halle	101,401	156,611
.. .. ..	357,122	456,126	Strassburg	123,500	150,268
.. .. ..	335,186	422,738	Dortmund	89,663	142,418
n	289,844	395,349	Barmen	116,228	141,947
e (Köln)	281,681	372,229	Danzig	120,338	140,539
ort-on-the-Main ..	136,819	288,489	Mannheim	79,058	140,385
berg (Nürnberg) ..	142,590	261,022	Aachen (Aix-la-Chapelle)	103,470	135,235
er	174,455	235,666	Brunswick	101,074	128,177
burg..	202,234	229,663	Kiel	69,172	121,790
dorf	144,642	213,767	Posen	69,627	117,014
.. .. ..	116,228	210,680	Krefeld	105,376	109,119
itz	138,954	206,584	Kassel	72,477	106,001
ttenburg	76,859	189,296	Carlsruhe	73,684	97,161
berg..	161,666	187,897	Duisburg	59,285	92,729
.. .. ..	78,706	182,135	Augsburg	75,629	89,109
rt	139,817	176,318	Mülhausen..	76,892	89,012
.. .. ..	143,249	161,507	Wiesbaden..	64,970	86,086

ANNUAL TRADE OF THE GERMAN EMRIRE (*in pounds sterling*).

	Average for 1872–75.[1]	1881–85.	1891–95.
mports	187,041,000	157,207,000	212,960,000
xports	124,720,000	158,039,000	172,100,000

THE GERMAN FOREIGN POSSESSIONS (*estimates*).

	Area in square miles.	Population.
rman East Africa	384,180	8,000,000
meruu	191,130	3,500,000
goland	33,700	2,500,000
rman South-West Africa	322,450	200,000
rman New Guinea	70,000	110,000
rshall Islands	150	13,000
roline and Marianne Islands	610	40,000
Total	1,002,220	14,363,000

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[1] The earlier statistics are less satisfactory than the later.

CHAPTER XVIII.—THE AUSTRO-HUNGARIAN MONARCHY

I.—AUSTRIA-HUNGARY

By Dr. Albrecht Penck,
Formerly Professor of Geography in the University of Vienna.

Position and General Character.—The Austro-Hungarian M
archy lies in the latitude of France, between 42° and 51° N., but far
east, in the interior of the continent, between 10° and 26° E. long. W
France has the sea on three sides and has longer coast-lines than
frontiers, Austria-Hungary is only touched by an arm of the Mediterran
and its land frontiers, towards the German Empire, Russia, Rum
Servia, Turkey, Montenegro, Italy and Switzerland, are five times lo
than its coast-line. No other part of Europe has so great a va
of geographical features, climates and nations. It embraces the gr
part of the Eastern Alps, with their
snow-clad summits, the greater par
the Boian or Bohemian plateau, n
the whole chain of the Carpathians,
a large part of their northern forela
the nearly level plains of Hungary, a
part of the Dinaric Mountains of the Ba
peninsula. Its western parts are under
climatic influence of the Atlantic Oc
in the east a continental climate prev
with hot summers and cold winters;
south has the mild winters and dry sum
of the Mediterranean, whilst the hig
summits in the Alps and Carpathians
the mean annual temperature of the A
regions. Extensive forests are found
pecially in the mountain districts. The eastern plains in the int
of Hungary, and on the northern slope of the Carpathians, are na
meadows, belonging to the steppes of south-eastern Europe. Cons
able areas in the south show bare rock with only traces of vegeta
All the races of Europe are represented in the Monarchy. The north
belongs to the *Teutonic* race—it is German. The east is occupie
different *Slavonic* peoples, separated into a northern group of three

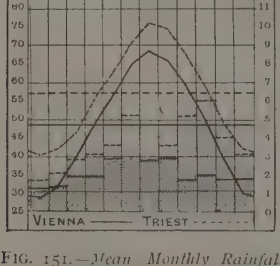


Fig. 151.—*Mean Monthly Rainfall and Temperature Curves of Vienna and Trieste.*

chs, Poles and Ruthenians; and a southern group of two, the Croats Slovenians; and by the *Hungarians*, whose language is not allied to that he other European races, but points to an affinity with the Uralian ples. The Mediterranean coasts and the south-east corner belong to *Latin* race; Italians in the west and Rumanians in the east. There are three provinces of Austria in which one language (German) is erally spoken. In Hungary there are numerous villages and even ns where three distinct languages are in common use. As to religion the western parts of Austria are uniform; they belong to the Roman holic Church. In the east Greek Catholics, adherents of the Eastern rch, and Protestants of different denominations are met with, and in eral towns the Jewish population is in the majority. On the Mediterean coasts the civilisation is directly derived from the Romans; the ine and Boian countries have shared in the evolution of German life ce the Middle Ages. The Carpathian lands and Hungary possess a ver civilisation, the Turks having been driven out from several parts y two hundred years ago. The Dinaric lands are only now entering the life of civilised Europe. The north-west of the Monarchy belongs he great manufacturing belt of Central Europe; the east, however, to agricultural lands of Eastern Europe.

Boundaries.—All these differences are found in a group of countries ich are united by their natural frontiers. The northern boundary is denined by a nearly continuous succession of different mountains. There the mountainous rims of the Boian lands, which surround the upper Elbe in, and the long arc of the Carpathians around the basin of the middle nube; thus Bohemia and Hungary are circumscribed, and both coun- s are connected by frequent passes. South of Bohemia the Eastern s form a mountainous country, which, drained mainly by the Danube, onnected by that river with the Hungarian basin. The same holds d of the Dinaric Mountains. Austria-Hungary is in fact the basin of the dle Danube, with its mountainous surroundings, to which is added the hbouring upper Elbe basin. Only that part of the Danubian slope of the aric Mountains, which forms the kingdom of Servia, does not belong to the narchy, and there the frontiers are determined by the great river Save he other hand, the Monarchy reaches the Adriatic Sea and stretches in Alps into the basin of the Adige, and even of the Rhine. In the north- Austria extends over the water-parting of the Carpathians and embraces owlands beyond. Towards the north a natural limit is drawn by the tile land along the Vistula, the river itself forming the boundary for a iderable distance, but towards the east the frontier is arbitrary. There our considerable openings in the mountain border, one by which the ube enters Austria as a navigable river; the second by which it leaves gary; the third is a breach between the Sudetes and the Carpathians; the fourth is the saddle-like gap between the Alps and the Dinaric ntains, which opens the way to the Adriatic Sea. Two highways of

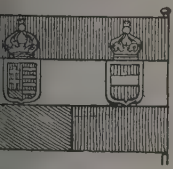
European commerce are determined by these openings ; one follows Danube to the south-east, to Asia Minor, the other connects the M terranean with the great plains of northern Europe. The crossing of t ways is the site of Vienna, the capital of the Monarchy, and a great ce of European activity.

People and History.—The large Austro-Hungarian basin has alw been an attraction for the neighbouring peoples, but it has rarely bee the possession of one nation. The Romans extended their Empire c the south-western half, in general not farther than to the Danube. T were thrown backward to the Mediterranean coast by Teutonic peo who did not occupy the conquered country, but left it to the Slav tribes which wandered, in the sixth century, over nearly the wh ground with the exception only of the western Alpine provinces. T came a new German immigration. The Bavarians followed the cours the Danube on its right bank, and settled between the Slavonic clan far as the mouth of the river Drave. Charles the Great (Charlemag extended the frontiers of his mighty empire as far east as this, formin eastern marches (Ostmark) there ; and he also conquered Bohemia. this way the western half of the Monarchy became connected with the German Empire. The east, however, was conquered at the end of tenth century by the Hungarians, who formed a national kingdom ; ano arose in Poland, a third in Bohemia, which however never ceased to German fief. Some of the rulers of these kingdoms favoured Ger immigration, and North Germans cleared the forests of the Boian mount and of the Carpathians as far as Transylvania, and founded numer towns on the left bank of the Danube, those on the right being mostl Roman origin. In 1276 the remnants of the old eastern marches, then ca *Oesterreich* (Eastern realm), came into the possession of the Habsb family, who gained the neighbouring countries by treaties of inherita At first they obtained the Alpine provinces, and later succeeded to Bohe and Hungary. This happened at a moment when the Turks had inva Hungary, and it needed two hundred years of continual fighting to conq that kingdom, and after its conquest Germans were settled on the devast lands. When, at the end of the eighteenth century, the kingdom Poland was divided, Austria gained Galicia, and soon afterwards rece Bukovina from the Turks. When the old German Empire ceased to e the Habsburg countries were declared an Austrian Empire, and this enlarged after the Napoleonic wars by some provinces in Italy, which h since been lost, with the exception of the Venetian colonies on the shore of the Adriatic Sea, in Dalmatia and Istria. Finally, in 1878, adjoining parts of Turkey (Bosnia and Hercegovina) were occup though nominally they still belong to the Sultan.

Organisation.—The gradual growth of the Monarchy can be c pared with a crystallisation of lands around their natural centre, tha Vienna. This happened in a peaceful way ; the different countries

ved their own organisations, and their inhabitants retained their own guages; but by the fact that German colonists were and are active rly everywhere the whole came into the sphere of German culture, and ugh the Germans form only 27 per cent. of the population, German is the guage of intercourse of the whole Monarchy, and is spoken by every cated man. Several attempts to amalgamate the different countries of Monarchy into one form State have been de and failed. In 1867 mplete home rule was ablished for Hungary, l the title of the strian Empire was re-ced by that of the stro-Hungarian Mon-hy. This name recalls t of the United King-n of Great Britain and land. Indeed, the re-ons between Austria l Hungary may be mpared to those be-een Great Britain and Ireland as they were before the final union. e Emperor of Austria is always King of Hungary, and in Hungary s only that title. The foreign relations, the army and navy, as ll as the customs-tariffs and currency, are common affairs to the ole Monarchy. In their internal administration both moieties of the Monarchy have complete independence, with their own parliaments and governments. Delegates elected by both parliaments arrange a new mutual treaty (*Ausgleich*) every ten years, and control the common affairs, which are administered by common Ministries for Foreign affairs, War, and Finance; the last named also administers Bosnia and Hercegovina. The official title of Austria is, "The Kingdoms and Countries represented in the ichsrat" (Austrian parliament); Hungary is called "The Lands of the ngarian Crown." Thus, independent in their own administration, both ieties are mutually dependent on one another in all foreign matters; l both together form one of the six Great Powers of Europe with a mmon flag.

FIG. 152.—*Austria-Hungary, showing countries and provinces. Austria white, Hungary stippled.*



G. 153.—*Austro-Hun-garian Merchant Flag.*

II.—AUSTRIA

By Dr. Albrecht Penck,

Formerly Professor of Geography in the University of Vienna.

The Empire of Austria.—Austria embraces the old Habsb possessions of the Alps (Lower and Upper Austria, Salzburg, Sty Carinthia, Carniola, Tirol, Görz, Triest), most of the lands of the old ki dom of Bohemia (Bohemia, Moravia, Silesia), parts of the former kingd of Poland (Galicia and Bukovina), and the Venetian colonies on the side of the Adriatic (Istria and Dalmatia). These four historical gro correspond in general to the natural groups of the Alpine, Boian, pathian, and Dinaric lands. Each of these groups consist of provin or Crown lands (Fig. 152), which still bear their old titles such as kingd or duchy, &c. Each has its governor, called *Statthalter*, and its provincial diet or parliament. They are all represented together in *Reichsrat*, or Austrian parliament, partly by popu election, partly by the election of privileged class

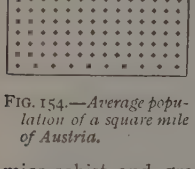


Fig. 154.—*Average population of a square mile of Austria.*

Alpine Provinces.—The Alpine lands Austria cover the larger part of the Eastern A and of the northern and eastern Alpine forela The characteristic features of the Austrian Alps two long rows of longitudinal valleys, with a m elevation of 2,000 to 2,500 feet running, like mountains, from west to east. They separate a c tral zone from two lateral mountainous belts. Central Zone consists of ancient rocks, gn mica-schist and granite. In the west it is cut into separate groups mountains, which reach heights of from 12,000 to 13,000 feet, and divided by passes of moderate elevation; the Ortler (12,800 feet) is culminating point; the Brenner (4,400 feet) is the lowest and most import pass (Fig. 51). East of the Brenner the Central Zone forms a long with summits of 12,460 feet (Gross Glockner), which is not interrupted any pass lower than 7,500 feet for a distance of 100 miles. Farther their height diminishes to 6,000 feet, and glaciers cease; the mounta lose their rugged form and become rounded, the valleys widen at sev places, especially in Carinthia, into basins, and some passes are be 3,000 feet. The lateral zones of the Eastern Alps consist of limestone, are therefore called the Northern and Southern Limestone Alps. In west they are lower than the Central Zone; the Northern range does reach more than 10,000 feet, the Southern not more than 11,500 f In the east, however, they surpass the Central Zone, and even at t ends have heights of 6,600 feet on the north, and 8,200 feet on the so

general, they rise as steep masses of naked rock, separated by
p valleys and low passes. In some parts there are beautiful lakes
hese hollows, *e.g.*, the Garda-lake, Achen-lake in Tirol ; and the lakes
the Salzkammergut. The Northern Belt is cut through by three
ortant rivers, which leave the northern row of longitudinal valleys ;
Inn, the Salzach and the Enns are direct affluents of the Upper
nube. Only one river of this line, the Mur, turns to the south-east
reaches the eastern forelands. In the southern row of valleys, how-
, the main river, the Drave, flows eastward, and parallel to it farther
h is another Alpine affluent of the middle Danube, the Save. Only
river of the southern line, the Adige, or Etsch, turns in a deep valley
the Plain of Lombardy on the south. There are numerous other
sages between the steep mountains, especially in the east, where the
eys of the Drave, the Save and the Tagliamento are connected by a
of passes lower than 2,700 feet.

North of the Alps there is a narrow strip of flat, undulating land, which
s eastward from 1,500 to 600 feet in elevation. It is narrowed in the
dle by the projecting southern corner of the Boian plateau to a width
nly six miles, forming the important *Austrian Gap*. To the west and
this foreland widens out between its mountainous walls. Its general
d is followed by the Danube ; but this mighty river prefers the course
gorge-like valley through the border of the Bohemian plateau to that
he lowlands. At Krems it leaves the plateau and runs to the north-
ern extremity of the Alps at Vienna. In the east several chains of the
s branch off into the Hungarian plain, a corner of which penetrates
n-like between them westward. The frontier between the two
ntries cuts off the branches and leaves the Styrian basin with Austria.
a hilly country, which rises gradually from 600 to 1,500 feet. In the
h-east the Southern Limestone Alps are connected with the Dinaric
ntains by the saddle-like Karst plateau, whose lowest point is a little
w 1,900 feet. It consists principally of limestone and exhibits the
cal development of all those features which are called Karst phenomena.
listinct valley-system is wanting ; the rivers run over flat basins,
end into caves, and reappear as great springs in other basins. The
roundings of Adelsberg are famous for the cave where the river Poik
ppears. In the same neighbourhood the lake of Zirknitz is formed
and then by the inundation of the low grounds from springs. The
ndest scenery is found along the subterranean course of the Reka in
Caves of St. Canzian (Fig. 158).

Climate and Agriculture of the Alpine Provinces.—The
nate of the Alpine lands shows great variety. The highest meteoro-
cal station on the Sonnblick (*i.e.*, Sun-glimpse, 11,190 feet) has the
ter of north-east Russia and the summer of Franz Josef Land. In
principal valleys the climate of the Alpine forelands reigns in a some-
t intensified form. Thus the eastern valleys have a strongly continental

climate with cold winters; in the valley of the Adige, however, t Mediterranean climate with warm winters extends nearly to the cen re the mountains, where Bozen and Meran lie in a climatic oasis. T northern valleys, like the northern Alpine forelands, have the relative mild winters of western Central Europe, and the temperature is oft raised by a warm south wind, called *föhn*. The range of temperatu however, is determined also by the elevation, and is less in the interi than in the border regions, especially on the forelands; on the Ka plateau, however, it is raw and severe. The rainfall is highest on t northern and southern rim of the mountains, where it rises in seve places to 80 inches per annum; the valleys are dryer than the foreland The snowfall increases with the elevation, and from 8,500 feet in t border region, from 10,000 feet in the inner parts, the Eastern Alps a covered to the extent of 600 square miles with perpetual snow. T Austrian Alps produce 1,000 glaciers; the largest and finest is the Paster near the Gross Glockner, 12 square miles in area.

Below the snow-line there is a zone of natural pastures, called t Alpine region. The last trees mount up to 6,000 feet, and in the interi at several places to 7,000 feet. The high ground is used during the summ as pasture; the lower slopes are woodland. Cultivated fields are rare found above 4,000 feet. Agriculture is therefore concentrated in t valleys, and no large village lies higher than 4,000 feet, only some hamle are met with in the western Central Zone as high as 6,000 feet. In t northern and eastern valleys grain is grown; in the valley of the Adi vine-growing prevails, and the mulberry-tree is cultivated for silkworm In the three Alpine provinces which are confined to the mountai (the County of *Tirol* with *Vorarlberg*, and the Duchies of *Salzburg* a *Carinthia* or *Kärnten*) nearly one-half of the ground is uninhabited; only or seventh of the area consists of arable land, while three-fifths are woodla and one-fourth pasture lands. The density of population averages 85 p square mile. The Alpine forelands, however, are excellent agricultu lands. In the eastern parts of the northern and in the Styrian basin the is extensive vine-culture; the Karst plateau bears still in most parts extensive original forests. The four Alpine Crown-lands, therefore, whi lie partly on the forelands, are far better populated than the three of t interior. The arable lands amount to 30 per cent., and the pastures to le than 10 per cent. The Archduchies of *Lower* and *Upper Austria* (*Unt* and *Ober-Oesterreich*), which extend from the Alps over their northern for lands and the opposite slope of the Boian plateau, have (without Vienn 184 inhabitants per square mile, while the Duchies of *Styria* (*Steierma* and *Carniola* (*Krain*), which extend over the eastern parts of the Alps, t Styrian basin and the Karst, have 149.

The principality of **Liechtenstein** is a very small independent Sta on the western frontier of Vorarlberg, united with Austria-Hungary mere by a Customs treaty.

Minerals and Manufactures of the Alpine Provinces.—The mines of the Central Zone being now exhausted, there are only five ortant mineral products in these mountains : salt in several parts of Northern Limestone Alps ; iron in Styria and Carinthia, especially at nerz, where a whole mountain consists of the purest iron-ore (whence name) ; lignite in some parts of Upper Austria, in the valleys of a and the Styrian basin ; lead in Carinthia (at Bleiberg) and Carniola ; mercury at Idria in Carniola. The Styrian iron, worked only with coal, already known to the Romans as Norian, has caused an extensive manufacture in the valleys of Upper Styria and the neighbouring parts of er and Upper Austria. But since the new processes of refining enable l iron to be made from poor ores, the Boian lands with their coal have me the chief centre of iron manufacturing in Austria. Another strial region of the Alpine lands is close to the Swiss frontier in rlberg, where there are numerous spinning factories, and where roidery is a branch of domestic industry. A third is in the south of l, where silk is produced and manufactured.

Communications and Towns of the Alpine Provinces.—The t lines of communication avoid the Alps as far as possible and follow Alpine forelands. There are two important routes in the northern eastern foreland, both converging on Vienna. (1) That of the northern and has the natural waterway of the Danube, and is followed by the stern Railway of Austria, which prefers, however, the low country be- en the Alps and the Boian plateau to the narrow valley of the great river. ere the river leaves its gorge for the first time and runs for some miles g the Alpine foreland, *Linz*, the capital of Upper Austria, is situated ; where the land route passes into Bavaria at the entrance of the Valley he Salzach, lies *Salzburg*, the beautifully situated capital of the duchy. The eastern foreland route, which goes to the sea, has no waterway, ough an artificial one was commenced but not finished ; it is followed he Southern Railway which has rather heavy gradients, for it cuts off north-eastern branch of the Alps, ascending by a wonderful piece of neering to the Semmering Pass (3,000 feet) and crossing the Karst. z, the capital of Styria, stands on the Mur, where the railway enters Styrian basin. The quarters on the left bank of the Mur are the site of Government offices, of a university and a technical school. On account heir garden-like surroundings they are much favoured by Austrian sioners. On the right side of the river there are large industrial estab- nents. The ascent of the Karst begins at *Laibach* (*Lubiana*), the capital Carniola, in a wide and partly fertile basin. The Southern Railway con- s with a line going over the low passes of the Central Zone and between Drave and Tagliamento directly to Italy. It passes near *Klagen-* the capital of Carinthia. One other great railway crosses the western of the Central Alps by the Brenner ; it connects Germany with Italy and erefore of international importance. It leaves the Inn Valley at *Inns-*

bruck, the capital and university-city of Tirol, and reaches the valley of Adige at *Bozen*, a place well known for the grandeur of its surroundin Farther down the line *Trient* (*Trento*) is the capital of the industrial part Tirol with Italian population. A third railway across the Eastern A is in course of construction between Salzburg and Sorizia. The lo northern row of longitudinal valleys has special importance for Austria they establish a direct connection with Switzerland, which is made pr ticable by a tunnel almost 6½ miles long through the Arlberg.

Taken as a whole, the Alpine provinces of Austria are a poor coun though there are some very rich parts in the valley of the Adige and the Alpine forelands. One-tenth of their area is uncultivated, nearly c fourth is poor pasture land, only one-fifth is arable. The populat without Vienna, is less dense than anywhere else in Austria, there be only 140 per square mile. It is for the greater part German (72 per ce Italian, however, in the south of Tirol (8 per cent.), and the Slover language is spoken in parts of Styria and Carinthia, and nearly the wh of Carniola. Cattle, cheese, wine, wood, iron, lead, and mercury fo the chief exports ; grain must be imported. In recent years the hig parts especially of Tirol, with their magnificent glaciers of the Oetzt Zillerthal, and Sulden, and the grand rocky scenery of the Dolomites, h become favourite summer resorts. Visitors also flock to the valleys Salzburg, Upper Austria (the Salzkammergut), and Carinthia with t charming lakes. The south of Tirol is important as a winter res especially *Meran*, *Arco* and *Riva* on the Garda lake. The hot springs *Gastein* in the Central Alps and those at several places along the east rim of the Alps, *e.g.*, *Baden* near Vienna, *Gleichenberg* and *Römerbad* Styria, are much frequented.

Bohemia.—The Boian lands of Central Europe form a plateau primitive and Palæozoic rocks, which are covered only in the north Cretaceous sandstones and marls. The centre is a basin-like depres forming Bohemia ; the peripheral parts belong in the north and west to German Empire, in the south to Upper and Lower Austria, and in the ea Moravia and Silesia. *Bohemia* (German *Böhmen*) is nearly contermin with the upper Elbe basin. Its south-west side is formed by the par ridges of the Bohemian forest, which reach nearly 5,000 feet in south, whilst they are in general lower than 3,000 feet in the north. the north-west side the Erzgebirge (Ore Mountains) rise abruptly heights of over 4,000 feet, which slope gently down to Saxony. Sudetes chain stretches in the north-east, the highest part, known Riesengebirge (Giant's Mountains) reaches in the Schneekoppe (sn dome) an elevation of 5,300 feet, which is the highest point of W Central Europe north of the Alps. Only the south-east side of Bohem without a distinct chain of mountains ; but instead there is a high region averaging 2,000 feet in elevation and in two groups of mount approaching 3,000 feet. The interior of Bohemia is hilly in the south

lf, and has a mean elevation of 1,500 feet; some chains, such as the Brda ountains) exceed 2,500 feet. The north is in general a level lowland, m 600 to 900 feet in elevation; near the Erzgebirge there is a group of lated conical mountains of volcanic origin, called the Mittelgebirge, 2,800 t in height, and in the northern corner a plateau of sandstone extends, ich is dissected by numerous valleys and gullies, forming the wonderful nery which is generally known under the name of Saxon Switzerland, t which, for the greater part, belongs to Austria.

The drainage of Bohemia is very regular. The Moldau, running from ith to north, forms a median axis to which rivers approach from h sides. Among them is the Elbe, which comes from the Riesenge- ge and continues the course of the Moldau northward. It breaks ough the Mittelgebirge in a charming valley, and leaves Bohemia in inding gap of the sandstone mountains walled by heights of 400 feet. is is the only point at which Bohemia can be left at a level below oo feet.

Climate and Vegetation of Bohemia.—The climate of the erior lowland is very agreeable, the summer is warm, the winter not cold. The rainfall is moderate; some parts, especially at the foot of Erzgebirge, are dry, the annual precipitation being only 16 inches. the south the climate is more severe, and it is raw on the surrounding untains. The winter is rich in snow, but the elevation is nowhere so h as to bring Bohemia beyond the limits of forest growth, and its ole surface is productive. The excellent soil of the interior lowland ours extensive agriculture; wheat and beetroots are grown on the thern slopes of the Mittelgebirge, the vine is productive as far north in the Rhine valley, and hops are cultivated at the foot of the zgebirge. Orchards surround all the villages. The hilly south is ye, oat, and potato country; while extensive forests cover the moun- ns of the interior and of the border region. More than one half of hemia is cultivated as arable land, and two-fifths are well-administered ests.

Bohemian Minerals, Manufactures and Towns.—The wealth precious metals once attracted many settlers, especially to the Erzge- ge; now most of the mines are exhausted; only at *Mies* in the west l at *Przibram* in the centre there are still silver mines, the latter being deepest on the continent (3,691 feet). The actual mineral wealth of hemia consists in its coal. Coal Measures occur in the centre near gue and Pilsen; lignite is found in enormous quantities, sometimes in ers nearly 100 feet thick, at the foot of the Erzgebirge near *Teplitz*, *x* and *Brüx*, and near *Eger*. The centre has iron mines, and all the ditions for extensive iron working exist. The quartz of the sandstone untains in the north has given rise to glass manufactures of all kinds, ecially of the well-known Bohemian cut glass. The kaolin deposits nected with the granite of Karlsbad favour the making of porcelain.

The rapid rivers of the Sudetes supply power for many spinning factories cotton manufactures are spread over the whole of the mountains, an *Reichenberg* is a centre of woollen manufacture. Many paper mills wor up the wood of the forest districts. A flourishing sugar manufacture based on the extensive cultivation of the beet; beer of superior quality brewed, especially at *Pilsen*. Numerous thermal springs are connecte with the former volcanic activity on the foot of the Erzgebirge. *Teplit Karlsbad, Franzensbad* and *Marienbad* are bathing-places of Europea celebrity. The picturesque scenery of the sandstone mountains near th Elbe Gap is also well known as a tourist resort.

The kingdom of Bohemia belongs to the densely populated countri of Central Europe. Its population has an average density of 315 p square mile; but in the industrial parts of the north it rises to 1,000 an 1,200. Of the people 37 per cent. are German, occupying the border regio especially the industrial district of the north, and 63 per cent. Chech who occupy the centre, and reach the frontiers only at three places.

The peripheral arrangement of the mountains and the convergent cours of the rivers of Bohemia favour the development of a natural centre, whic is the main crossing-point of all radial lines of communication. This *Prague* (*Prag, Praha*). It lies in the midst of the country on both sides the Moldau in a rather narrow valley, but the suburbs extend over th neighbouring heights. Seen from the Hradschin, the castle of the ol Bohemian kings on the left bank of the Moldau, the city is highly pict resque, with its numerous towers and monumental buildings on prominen points. But the interior is narrow and unhealthy; an aqueduct is wantin and the population increases slowly. Prague is the capital of Bohemi with the Government offices, two universities and two technical schools- one for the Germans, one for the Chechs. The suburbs, which raise th number of the mainly Chech population to over 470,000, are the industri quarters. The manufacture of engines and railway cars is considerabl The other towns of Bohemia are of less importance. They lie on th numerous radial railway lines near the frontiers, *Budweis* on the southern *Pilsen* on the south-western, and *Reichenberg* on the northern line. Th Elbe is the chief traffic route from Bohemia to the sea; on it, the fronti is passed annually by 20,000 vessels, and there are railways on both side of the river. *Aussig* and *Bodenbach-Tetschen* are considerable river-ports.

Moravia and Silesia.—Moravia and Silesia (in German *Mähre* and *Schlesien*) occupy the south-east side of the Boian plateau and stretc over the lowlands, bordering the western chains of the Carpathians, whic form their eastern frontier. The south is drained by the March t the Danube, the north by the Oder to the Baltic Sea. The wate parting between the two rivers is low in the Carpathian forelands, an forms the deep Moravian Gap between the Boian plateau and th Carpathians. It allows of the construction of a canal connecting th Baltic and Black Seas, the summit level on which is less than 1,000 fee

the north of both countries, at the sources of the Oder and the rch, the eastern extremity of the Sudetes forms a plateau 2,000 feet gh, and rising in the Altvater to nearly 5,000 feet. In spite of the igh climate there is a crowded German population, carrying on the strian linen manufacture. In the south the low ground penetrates sinlike between the Boian plateau and the Carpathians; the climate these parts is mild, and agriculture flourishes; barley and beetroot are tensively grown; even the vine is found. The Carpathians at the stern frontier are extensively wooded. The Silesian coal basin of Prussia tends over the Austrian frontiers; *Witkowitz* and *Mährisch Ostrau* are chief places for coal-mining in Austria, and since the neighbouring rpathians supply iron, there is also a centre of iron manufacture. e plateaux at the sources of the Oder contain beds of roofing slates, ich are much worked. The south has scarcely any mineral wealth. The rgravate of Moravia and the Duchy of Silesia have an average density population of 295 per square mile; the industrial north having a denser pulation than the agricultural south—in some parts of Silesia there are oo inhabitants to the square mile. Of the people, 33 per cent. are rmans, 60 per cent. are Chechs, and 7 per cent., in the eastern parts of esia, are Poles.

Towns of Moravia and Silesia.—The lowland between the Carhians and the Boian plateau is the principal way of communication of Monarchy. Its rivers are not navigable, but it is followed by the most quented Austrian railway, the Northern. It points to Vienna, which refore absorbs the Moravian trade, and hinders the development of considerable centre in that country. The capital of the margravate is *inn* (*Brno*), on the edge of the Boian plateau, where the main route m Bohemia enters the lowlands. It is the chief centre of Austria for ollen manufactures, and has two technical schools. One-half of its inbitants are German. Another woollen manufacturing place is *Iglau*, a rman-speaking town on the heights adjoining Bohemia. The former pital of Moravia, *Olmütz*, is situated in a fertile basin of the Upper rch, and has, though it is the ecclesiastical centre of the country, only al importance. The capital of Silesia, *Troppau*, is an active place with a rman population close to the Prussian frontier.

Vienna.—The two main routes in the eastern and northern Alpine elands and the Moravian route along the south-east side of the Boian teau meet at Vienna. In the east there is a whole series of gaps tween the Alps and the Carpathians, termed together the Hungarian te, where the Danube enters the great Hungarian plains. Vienna, therere, has a commanding position between the Boian and Alpine lands on e side, and Hungary on the other. The routes through the Austrian p to South Germany, and through the Moravian Gap to the plains of rthern Europe, unite here with the Semmering route to Italy, and e ways through Hungary to the south-east of Europe. Over the low

south-eastern edge of the Boian plateau the Elbe Gap of Bohemia ca
also be easily reached, and by means of the longitudinal valleys of th
Alps the Rhine basin is accessible. Vienna lies at the crossing of gre
routes from London, Berlin and Paris to Constantinople, and from S
Petersburg to Rome (Fig. 54). Its general situation has thus no equ
in Europe, and the more immediate surroundings of its site are also ver
distinguished.

The north-eastern branch of the Alps, called the Kahlengebirge, term
nates with a height of nearly 1,800 feet over the low plain of the Vienn
basin with an elevation of 600 feet, and both are cut off by the magnificer
river. The mountains bear a beautiful forest, the Wiener Wald; the

FIG. 155.—*The Site of Vienna.*

base is covered with vineyards, and the plain is richly cultivated. Th
site of the city is the corner between mountains, plain and river. Onl
one industrial suburb (*Floridsdorf*) lies on the left bank of the Danube, an
only the smaller part of the city is on the river plain; the principa
quarters extend on the hills to the right of the river and stretch even int
the valleys of the Kahlengebirge, along the base of which there is a con
tinuous belt of small towns from *Klosterneuburg* in the north to *Mödlin*
in the south, a distance of 20 miles. Vienna is the intellectual and materia
capital of Austria-Hungary. It is the seat of the Imperial Court, of th
Common Ministries and of the Austrian Government. There is an old
much-frequented university, and there are also a polytechnic schoo

academy of agriculture, and rich museums of fine art and natural tory. Commerce has at its disposal in the Danube the longest water- y of Europe outside Russia, and eight important railways radiate in all ections. The city and its neighbourhood form the chief industrial trict of the monarchy. There are extensive iron and engine works, the nufacture of all kinds of metal goods, especially of bronze and instru- nts, is important; Viennese furniture, clothes, leather and fancy wares objects of large export. In the Vienna basin there are numerous nning factories and paper mills.

Vienna (German *Wien*) derives its name from the Roman camp of ndobona, but it does not retain many signs of high antiquity. The ges of the Turks destroyed the ancient suburbs totally, and large parts the city; the magnificent St. Stephen's Cathedral is the only relic of cient times. The older houses date principally from the eighteenth ntury, but the greater part are modern; the Ringstrasse is one of the st magnificent modern boulevards in the world. The quickly creasing population is almost exclusively German.

The Carpathian Lands.—The long arc of the Carpathians is cupied by Austria only on its western and north-eastern slopes. The rmer stretches through Moravia and Silesia, the latter through Galicia d Bukovina. These two Crown-lands extend from the mountains over e Carpathian foreland; and Galicia even reaches the Podolian plateau, nich forms the water-parting between the Dniester and the Dnieper. ne Austrian Carpathians form a chain of sandstone ridges which con- nue the Kahlengebirge, at first in a north-easterly and then in a south- sterly direction. In the west they gradually rise to 4,000 feet in Silesia d 5,000 feet in western Galicia; at the point where the direction of the ains turns at a right angle there are numerous passes of from 1,150 to oo feet in height, called the Eastern Beskids, which afford short ssages from Galicia to the plains of lower Hungary; the Western eskids are the passes between Silesia and upper Hungary. The eastern ains rise in the Czornahora (Black Mountain, over 6,750 feet). In the uth of these sandstone mountains the Upper Hungarian plateau extends. consists of old rocks, which now and then rise to sharp ridges. The ghest is the High Tatra, which culminates with 8,740 feet. From this ghest part of the whole Carpathians two rivers break through the sand- one chains; along one of them the frontier of Galicia sweeps up to the igh Tatra. The sandstone ridges of the Carpathians are thickly covered ith forests; the whole chain, therefore, is often called the Forest Car- thians. Only the highest chains of the east arise above the tree-line; cy are covered with grassy flats called polonines, which correspond the Alpine region. The Tatra, however, is a rocky ridge with some ep corries, the tarns of which are called "eyes of the sea."

Galicia and Bukovina.—The Carpathian foreland is a low, un- ulating country with a mean height of from 600 to 900 feet. As there is

only a low watershed in the west between the March and the Oder, the
are also in the east, in Galicia, low water-partings between the Vistu
Dniester and Pruth. These rivers are navigable for flat-bottomed boa
The soil is fertile, with the exception of the angle between the Vistu
and the San, where it is too sandy. The Podolian plateau swells gen
north of the Dniester, and forms an escarpment of 600 feet against t
flat moorlands, which are drained to the Vistula and to the Dnieper. T
water-parting between the Baltic and Black Seas is here flat and indistin
Numerous parallel rivers run from the plateau southward to the Dniest
they have, like the latter, a meandering course, and flow in deep valle
The heights of the plateau are part of the steppes of south-eastern Europ
the woods are restricted to the steep sides of the valleys.

The climate of Galicia and Bukovina is continental; the summ
are hot, the winters cold; the country is open to the snowstorms of Russ
The rainfall is not great, but occurs throughout the whole year. In t
mountains it is sufficient, but the temperature is low. By their elevati
the Carpathian lands are divided into agricultural lowlands and wood
highlands. Nearly one-half of the land is arable; wheat and maize in t
east, rye and potatoes in the higher regions, are the chief crops. T
forests cover two-sevenths of the surface; they consist in the low
mountains of beech (the name of Bukovina is derived from the bee
forests), and in the higher regions pine woods prevail. The sandstone
the Carpathians contains natural oil at numerous places, which is bored f
especially at Drohobycz, in the same way as in Pennsylvania. Natural w
is also dug. The Carpathian foreland is rich in salt, which has be
mined as rock-salt at Wieliczka, near Cracow, for centuries; at Stanisl
and other places it is obtained in the form of brine. In the west a sm
part of the Silesian coal-field extends into Galicia.

The population of the Carpathian lands is large, and its densi
is nearly the same as the average for Austria. The lowlands co
tinue the thickly populated zone of the German central mountai
eastward to the Podolian plateau, and there 300 per square mile a
found. The Carpathians are, however, poor in men. There are s
hundreds of square miles in eastern Galicia and Bukovina covered w
virgin forests, without a single village. The two Slavonic nationalities
Galicia are nearly equal in number; the west belongs to the Poles (55 p
cent.), who are dominant, the east to the Ruthenians (42 per cent.).
Bukovina the latter meet with the Rumanians, and there are 22 p
cent. of Germans. The general condition of the population is unsat
factory. There are rich landowners and poor peasants, whose wages a
below the minimum which can be held sufficient, and who are, for t
greater part, illiterate. The trade is in the hands of the Jews, who fo
one-eighth of the inhabitants; manufactures are undeveloped, with t
exception of distilling brandy, which, together with potatoes, forms t
usual diet of the people. Everything else must be imported; the expo

nsist of grain, cattle, wood and horses, which are bred in the east, ecially in Bukovina.

Towns of the Carpathian Lands.—The Carpathian foreland in licia is followed by one European main route. In the south the untains, in the north the swamps of the Pripet, hinder free communi-ion. The ways from western Austria and Germany to the south-east nverge to one point of the western Carpathian foreland, run together on cast, and diverge on the Podolian plateau to Russia and Rumania. us there are two centres in Galicia. *Cracow* (German, *Krakau*, Polish, *aków*) commands the entrance from the west, and the substantial pearance of the city bears witness to its importance from olden times, en it was one of the outposts of the Germans in the east. Later, acow was the capital of Poland; the Polish kings are buried there, and s still a centre of Polish life. It has an old Polish university and a dern Polish Academy of Science. The commerce is still considerable. e commanding position of the city is expressed by its selection as one the strongest Austrian fortresses for the defence of the upper valley of Vistula. The inhabitants are mostly Poles. *Lemberg* (Polish, *Lwow*) is radiating point of the east. Here the main railway line, which follows Carpathian foreland, and is the continuation of the Austrian Northern ilway, sends off two branches to Russia, to Kiyev and to Odessa, and is nnected by a transverse line with Budapest. Lemberg was, since its ndation, the capital of the Ruthenian provinces of Poland, and the ghbourhood has a Ruthenian population, but its inhabitants are for the eater part Poles, and the Ruthenians are less in number than the rmans. In the Middle Ages Lemberg also was a German outpost. ere is a university and a technical school. The manufactures have y local importance. Between Cracow and Lemberg lies *Tarnów*, on the rnajec, and *Przemysl*, a strong fortress, which defends the eastern skids, on the San. On the two lines from Lemberg to Russia the chief wns are *Brody* and *Tarnopol*; the continuation of the main line to the th-east passes through *Kolomea*, on the Pruth, and reaches the Russian l Rumanian frontier near *Czernowitz*, a somewhat new town on the ht bank of the Pruth, which is the capital of Bukovina. It has im-rtance as a local centre, and as a frontier place. Its population is more ked than that of any other town in Austria; Jews, Greek Christians, l Roman Catholics are nearly equal in number; the German language dominates, and is used in the university, which was founded in 1875.

The Dinaric Lands.—The narrow strip of the Dinaric lands ich forms the Austrian coast is accompanied by a mountain range, 00 to 6,000 feet in height, which consists of limestone, and shows all the gularities of the Karst phenomena. Deep valleys are wanting, and y one fairly long river from the interior, the Narenta, reaches the sea. ow foreland forms the peninsula of Istria. Farther south there are ie low grounds in the middle of the Dalmatian coast, on both sides of

which rows of long islands follow the coast, the ridges of a drowned lan
The northern part of the coast extends along the Karst, which continu
the mountain range at a height of only 2,000 feet; and a small part of t
Plain of Lombardy, at the mouth
the Isonzo, belongs also to Austr

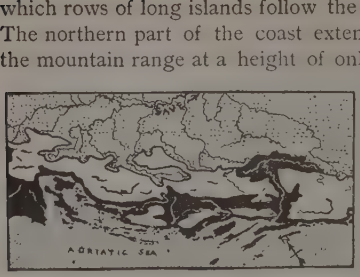


FIG. 156.—*The Karst. The map measures 300 miles by 150. Karst region, white; Adriatic drainage, black; Danube drainage, stippled.*

The climate of the Austri
coast, which stretches betwe
45° 45′ and 42° N., is truly Medit
ranean. The winters are war
and relatively rainy, the summe
are hot and dry. In the nor
especially along the Karst, t
Bora is a frequent cold and d
wind coming from the interi
and the charms of the Mediterranean climate can only be enjoyed
places like Abbazia, which are sheltered from it. The south wind, call
Scirocco, is warm and moist; the sudden changes between Bora a
Scirocco are consequently very disagreeable. The evergreen bushes a
trees, and the culture of the olive reach from the sea to 600 and 1,000 fe
The higher slopes are bare rock, and the growth of trees is hindered
the strength of the Bora and the heavy rain showers of the Scirocco. T
mean annual precipitation, which is at the coast above 40 inches, ris
here to 80 inches, and at several places even to 200 inches. T
forests have often been devastated by reckless wood-cutting.

Resources and People of the Dinaric Lands.—The co
figuration and the soil of the Austrian Coast-lands do not favour agricultu
Only one-eighth of the land is arable; the olive gardens and vineyards a
nearly as extensive. In the north, near the mouth of the Isonzo, m
berries are cultivated for silkworms. Nearly one-half of the grou
serves as pasture for sheep, and especially goats. The mineral wea
is confined to some coal-beds in Dalmatia: excellent building sto
is quarried in Istria; the Brionian islands, near Pola, furnished t
marbles of Venice. The sea affords a rich fishing-ground, resorted to
11,000 fishermen. The trade in fish with the interior suffers, howev
from the want of means of communication.

The population of the maritime provinces, consisting of the County
Gorizia, the Territory of Triest, the Margravate of Istria, and of the Kin
dom of Dalmatia has a density of 168 per square mile, much below t
average. The greater number of the people (68 per cent.) are Slavon
in the north Slovenians, in the south Croats and Servians. In t
harbours, and along the coast of the maritime provinces, descendar
of the old Roman population still exist, refreshed by Italian colonis
Nearly 30 per cent. of the inhabitants are Italians, and Italian is t
language along the sea. The German element forms little over 1 per ce

Coast Towns.—The Austrian coast has many excellent ports alo

Dinaric Mountains, but most of the deep and sheltered bays have no ortance, since there are no practicable ways from them into the rior. That part of the coast, however, which can be easily reached n the other Austrian provinces over the Karst has no good harbour. *st* lies on the slope which rises directly to 1,000 feet round an open bay. ancient Greeks had a settlement (Tergeste) on this site, but its de- pment as a harbour dates only from the decay of Venice, when Austria an to make efforts for maritime power. By the foundation of the trian Lloyd Steamship Company, and since the opening of the railway, ch ascends the Karst in a long loop, Triest became a port of interna- al importance, but being exposed to the full force of the Bora, and ng only one mountain railway to the interior, notwithstanding many rovements, it has not the rank which the country deserves for its chief ort, and the trade of the whole north of Austria gravitates to German s. The population of Triest does not increase uch as that of other Austrian cities; it is mainly an. The great military port of Austria, *Pola*, on a deep and sheltered bay near the south t of the peninsula of Istria, from which the hbouring coasts can be easily defended. The ital of Dalmatia, *Zara*, is a port of local value the Dalmatian lowlands. In the south, *Ragusa* in the Middle Ages the chief harbour of the le Dinaric coast; now it is a dead place, but there is a narrow-gauge way to the interior of Hercegovina and Bosnia.

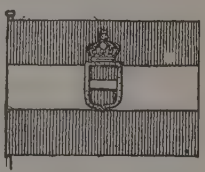


FIG. 157. — *Austro-Hungarian Naval Ensign.*

The shores of Dalmatia are amongst the most beautiful of Europe. y combine the steepness of the Norwegian coast with Mediter- ean scenery and the picturesque relics of an old civilisation. Nothing be compared with the deep narrows (*bocche*) of *Cattaro*, where the penetrates in several basins among cliffs of 6,000 feet in height. At *lato* a whole town is built in the ruins of the palace of the Roman peror Diocletian (whence, indeed, the name of *palace* is derived). Palms w on some of the islands, especially at Lissa. Dalmatia will one become a favourite haunt of tourists, and its sheltered towns will be ed as winter resorts. But it is still very isolated, and its inhabitants remely ignorant, only 31 per cent. of them being able to read and write. *azia*, near Fiume, and the island Lussinpiccolo, are winter stations.

III.—HUNGARY

By Dr. Béla Erödi,
President of the Hungarian Geographical Society, Budapest.

Position and Extent. — The Kingdom or State of Hungary *gyarország*=Land of the Magyars) lies about the middle of the southern of Europe in the basin of the Danube, between the same parallels of

latitude as France, north of Bordeaux. Its form resembles a semicir and excepting a small part of the western side, it is separated on three si by natural boundaries from the neighbouring lands. On the west, no and north-east these are hereditary provinces of Austria, which form w it one monarchy; on the south-east and south Rumania and Servia, the south-west the occupied provinces of Austria-Hungary. Hung is a continental country; only on its extreme western boundary doe small portion of it touch on the Adriatic Sea. The natural boundar are formed on the west, north-west, north, north-east, east, south-east a south by the mighty range of the Carpathians, then on the south by Danube, the Save and the Unna, and finally on the west by the Lei (*Lajta*) river and Leitha hills, which separate it from Austria.

Configuration of Surface.—Hungary is surrounded for more th 1,000 miles by the immense curve of the Carpathians, which, start from the gate of the Danube at Dévény (near Pozsony) sweep round o half of the country from west, through north and east, to south, where th again reach the Danube at the so-called Iron Gates (*Vaskapu*) near Orso This great range of mountains is divided into three principal secti forming the north-western, the north-eastern, and the south-eastern hi lands. The most interesting of the mountains is the High Tatra (*Ma Tátra*), in the north, a picturesque high mountain group, without any fo hills. Its loftiest peaks are those of Lomnicz, more than 8,600 feet hi and Gerlachfalva (named since 1896 Ferencz József Peak), 8,737 feet, highest mountain in Hungary. These are all bare rocks, on which some places snow remains even in summer; and in their hollows m than a hundred small mountain tarns, the fairy-like "eyes of the se attract many visitors to this splendid mountain wilderness. The m extensive members of the Carpathian system are the south-eastern hi lands, which form one grand natural fortress, through which there few passes. The Vereczke Pass, in the north-eastern frontier range famous in history as that by which the Magyars entered the country in t year 898. The offshoots of the mountain system of the Alps, which en Hungary, are divided into three chief groups. Between the Danube a the Drave, the eastern offshoots of the Noric Alps, between the Drave a the Save, the last spurs of the Carnic Alps, and finally between the Sa and the Adriatic the eastern continuation of the Julian Alps. In the spa surrounded by the Carpathians and the Alps stretch two level expanses land—the Little and the Great Hungarian Plains. The *Little Hungari Plain* (*Kis-Alföld*) lies in the western part of the country, upon the islan and both sides of the Danube from Pozsony to Esztergom. Its extent about 5,000 square miles; the lowest portion of it is the Hanság, betwe the Fertö (*Neusiedler*) lake and the Rábcza river. This plain, called a the Pozsony basin, is exceedingly fertile. Coming through the passes the Danube at Vácz from the small plain, we reach the *Great Hungari Plain*, the most characteristic part of the country, lying in the centre

tland and bounded by the Carpathians on one side and the Lower ube on the other. It occupies about 30,000 square miles. The Tisza *iss*) traverses its greatest length. This plain, appearing as an unend- and for the most part uniformly flat surface, is not so monotonous as it ears upon a map. Its surface is undulating ; rows of mounds and sand- es are frequent, in many places there are deep hollows which are damp impregnated with alkaline salts, in other parts there are marshes. in general the plain is very fertile, ploughed fields stretch to the zon, and the immense pasture-grounds are filled with herds of horned e, horses, sheep and swine. The villages, fringed by rows of shady s, especially acacias, stand at great distances apart, but are large and ulous, and are transversed by State, county and communal roads and vay lines.

Hydrography.—Most of the rivers belong to the Danube system ;

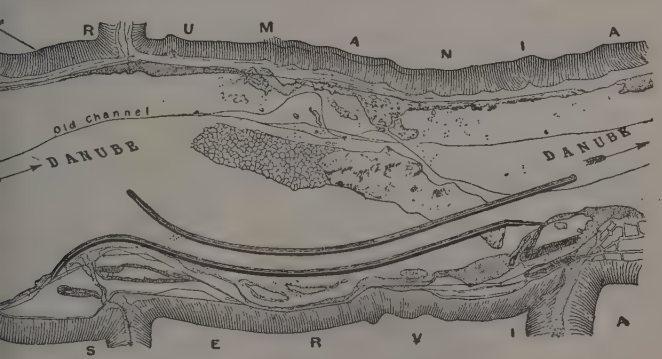


FIG. 158.—*The Chief Canal at the Iron Gates.*

two streams having their sources in the High Tátra flow to the ula. The *Danube* (*Duna*), which is the principal waterway of ngary, traverses the country for almost 600 miles, forming several e islands in its course, of which the most important are Csallóköz Szigetköz between Pozsony and Komárom, the first formed by a nch on the left, the second by a branch on the right of the main am. The island of Szent Endre is above and that of Csepel below capital. The Danube is navigable by steamships ; the rocky bed of Iron Gates, which was dangerous to navigation, has been cleared and obstacles removed by the Hungarian Government. Tributary streams he Danube on the left hand are the Morva (forming in part the Austrian ndary), Vág, Garam, Ipoly, Tisza, Temes ; on the right side the Lajta itha), Rába, Kapos, Drave (which receives the Mura) and Save. The *ca* is the one great truly Hungarian river, as it rises and ends in

the country. In the Hungarian coat-of-arms four silver stripes represe the Danube, the Tisza, the Drave and the Save (Fig. 159.) Hungary contai only two large lakes, the *Balaton* and the Fertö, both on the right side the Danube. The Balaton (or Platten lake) has an area of 230 square mil and stands 420 feet above sea-level. It is separated into two parts by t mountainous peninsula of Tihany. On its banks mineral springs of ac water burst out at Balaton-Füred, which is a celebrated watering-plac The lake is commonly called the *Hungarian Sea*, and its shores are mu cultivated. The *Fertö* (or Neusiedler lake) has an area of 110 square mil and stands 370 feet above sea-level, but its surface is not permanen Between the streams there are many canals for navigation. Mineral wate are abundant in many places.

Resources of Hungary.—More than 97 per cent. of the soil of Hu gary is productive, and about half of this is arable land. The plains, t land between the Danube and the Drave, and between the Drave and Sa are covered with black, yellow, and sandy earth, which, in the highland is mixed with gravel. The alluvial and diluvial deposits in the plains for good soils for the growth of wheat, rye, barley and maize, the crop of whi not only supplies the country but furnishes a great export. The mountai are chiefly formed by granite, upon which rest crystalline schist formation The Carpathian sandstone is widely distributed. The mountains conce many mineral treasures, which have been mined from very early time Iron-ore is very abundant ; the mountains of Transylvania produce mu gold ; silver, copper, cobalt, nickel, mercury, zinc and lead are found varying quantities. A special product of the country is the noble op which is found in the trachyte beds near Vörösvágás. Salt is found immense abundance in Transylvania and Máramaros. There is plen of coal and lignite, and petroleum is also worked. The mountainou districts are covered with forests ; the woods occu 30 per cent. of their area, in contrast with only from 1 to 5 per cen of the plains. The export of timber is important. The most comm trees are the oak, poplar and acacia. Fruit trees are largely cultivated, an Hungary furnishes apples, pears, and plums for export. Wine productio is of great importance, for the grape grows and ripens well almost ever where. Cattle breeding has not received as much attention as agricultur though lately the breeding of horned cattle, horses and swine, has show improvement. The bear, fox, wolf, badger, wild cat and lynx, the ro red deer, wild swine and wild goat are common in the immense forests.

Climate.—As Hungary, excepting one small portion on the Adriat Sea, lies far from the ocean, the climate is moderately continental. Thr types may be distinguished—that of the mountain districts, of the plai and of the sea-coast. The winter is in general very cold, especially in th great plain and in the inner basin of Transylvania ; the summer is hott than in western Europe in the same latitude. In the highlands the clima is very variable, but snow does not lie in summer, except in some hollo

ne High Tátra. The rainfall is very capricious. Most falls, on the age, in spring and autumn in the north and north-eastern highlands, and ne Transylvanian mountains; and less in the Great Plain. The yearly fall in the Carpathians is on an average 40 to 50 inches, while on the t Plain it is 20 to 25 inches. The most cloudy season is spring. In mer the *délibáb*, or Fata Morgana, is a very charming and everyday nomenon, which on tranquil, warm days rises about noontide, and like splendent sea spreads over the heated plain as far as the eye can h. Fiume has a very dry summer and a very rainy autumn and er; strong north and north-east winds (*bora*) prevail.

History.—The territory of the present kingdom of Hungary was reat highway of nations. At the earliest period after the Romans e the Huns, under King Attila, after whose death the empire fell in es. After German people came the Avars, an Asiatic nation, which bited this land for two and a half centuries, until Charlemagne e their power. The Hungarians, who lived in the earliest time in , between the Lower Irtish and the Ural, and later between the Lower eper and the Don (Lebedia), penetrated in under the leadership of Árpád, through the of Vereczke into their present country, and ed in it after subduing the different nations of land. The house of Árpád reigned till 1301. hen, the first king, converted the nation from henism to Christianity, was crowned in 1000, organised the Hungarian State according to tern patterns. The Hungarian State attained greatest area under King Nagy Lajos (fourteenth century), and under g Mátyás, surnamed the Just, it came to the climax of its glory, both tary and political. In 1526, after the catastrophe of Mohács, where the garians were defeated by the Turks, the Habsburg dynasty succeeded, Transylvania was created a separate principality under national ces. The Turks occupied a great portion of the land and were not ly expelled for nearly two hundred years. In 1723 the Hungarian iament accepted the Pragmatic Sanction, which established the ession of the female line of the Habsburgs. In 1848 laws were enacted ch abrogated the old constitution, introduced parliamentary govern- t with a responsible national ministry, reunited Transylvania to the ner country, abolished all agrarian burdens, asserted the freedom of press and the complete legal equality of the recognised religions, and e many important reforms. Events, however, necessitated a fresh ggle with Austria, which, by the help of a large Russian army, imposed riod of absolute government on Hungary for eighteen years.

The constitution of 1848 was restored by King Francis Joseph in 1867. t year was the beginning of a new era, and since then progress in y department of national life has been rapid. In virtue of the

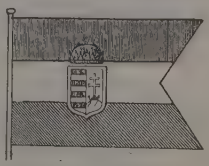


FIG. 159.—*Hungarian State Flag.*

Hungarian Constitution the Apostolic King of Hungary, whose pers sacred and inviolable, shares legislation as a joint right with the parliar which he summons for a term of five years. The House of Com consists of 413 representatives chosen by Hungarian districts, and deputies of the Croatian-Slavonian Diet. Members of the Hou Magnates sit in virtue of inherited right, office, or dignity, or by nation or election. The Royal Hungarian Cabinet consists of the dent of the council and of nine Ministers, including the Croatian-Slav Minister without a portfolio. In virtue of the Pragmatic Sanction, Hu and Austria are independent States allied with each other, but prese their own sovereignty undiminished, with separate and independent administration. But by the personal identity of the ruler, they for mutual protection one monarchy. For the management of the com affairs 60 delegates, who meet alternately at Budapest and Vienna chosen by each parliament, the Hungarian Parliament selectin members from the House of Deputies and 20 from the Magnates.

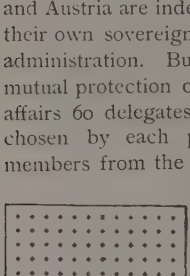


FIG. 160.—*Average population of a square mile of Hungary.*

contribution for common expenses is arrange mutual agreement for ten years at a time; the a quotas are 30 per cent. for Hungary and 70 cent. for Austria.

People.—The people of Hungary are comp of several nationalities, all together forming the garian nation. The Hungarians proper, or Mag are the leading element, for although they only about one-half of the population, 80 per of the people speak the Hungarian languag proportion which is increasing every year. It be particularly stated that the Hungarian who conquered the country and created the kingdom take the lea position also in intelligence; and far from oppressing the other na alities, they allow to all the same rights and privileges. Be Hungarians there are (in order of their number) Serbo-Croats, manians or Walachians, Germans, Slovaks and other nationalities, w number together does not amount to more than a million. Accordi religion, the greatest part of the population belongs to the Roman Greek Catholic Churches; then follow the non-united (or schismatic) Ch the Protestant Churches of Calvinist and Lutheran confession; finall Unitarian confession and the Jews. The Roman Catholics, the U Greek Church, and the Armenian Catholics are under the authority o Pope in Rome. The king must belong to the Roman Catholic faith.

The people of Hungary live chiefly by agriculture, the breeding o stock, and mining, to which occupations they are directed by the n of the soil. They have no great inclination for industry; therefor imports are almost double the value of the exports. Though makes great progress by the increasing extension of railways, the

orresponding capital and enterprise allows many natural resources eat value to lie undeveloped. Yet material and intellectual progress markable. At the census of 1890, 61 per cent. of the male and r cent. of the female population above the age of six years could and read. Higher instruction is provided by three universities, ly. at Budapest, Kolozsvár, and Zagreb, and many colleges for higher ng in special subjects. The supply of secondary schools is better in Austria, and approaches to that of some States of Germany. The maceutical, philosophical and medical faculties of the universities pen to ladies. Great progress is made in the provision of technical ols. As for the administration, Hungary (the mother-land) is divided 63 counties (*vármegye*), at the head of which stand the prefects (*főispán*) deputy-prefects (*alispán*). Croatia-Slavonia numbers eight counties. gary is well supplied with railways; more than three-quarters of the e Hungarian system belong to the State or are under the management e Hungarian State Railways. The present tariff for passengers, the so-l zone system, was inaugurated in 1889, according to which the long nce is divided into fourteen zones, and the price is regulated by ons. In the zone tariff the longest journey, from 140 miles to any nce which can be traversed in twenty-four hours, costs only $5 first- which is the maximum fare for any journey in the kingdom.

Hungary Proper.—*Budapest* is the capital and residence-town of gary, situated in a splendid on on both sides of the be, a short distance below eat bend from an east- to a southward course, unded on the right bank icturesque hills, the off- s of the Alps. One of hills which dominates city is the site of the l Palace, and another, d Mount St. Gerard t - *Gellérthegy*), rises otly from the Danube to ight of 720 feet above vel. The left bank of Danube is a plain. Buda ie right and Pest on the ide formed, before 1873, towns with separate ad- trations, but are now united. They are connected by several bridges ssengers and two railway bridges. The town is the residence of the who is understood to reside there for half the year; it is the seat

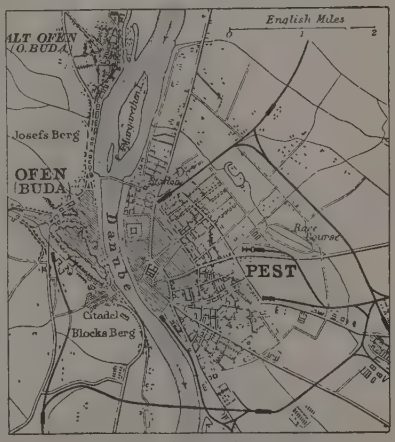


FIG. 161.—*Budapest.*

of government, of the parliament and of the supreme courts. It
many public institutions, including the Hungarian Academy of Scien
the National Museum, with rich collections in different branches,
the National Picture Gallery. Budapest has a university, a polytech
many colleges, technical schools, and learned societies. It is also
centre of the commercial as well as of public and intellectual life of
kingdom. The population is increasing rapidly, at the average rat
about 10,000 a year. The town presents a very animated appearance,
the electric tram-lines which intersect it in all directions, and the g
steamer traffic on the Danube. The boulevards and ring-streets and
colossal new buildings testify to the enthusiastic spirit in which
improvement of the city is carried on with reference to art as wel
material progress. Amongst them the new Royal Palace, the new Pa
ment House on the left bank of the Danube, modelled after the Parlian
Houses in London, the new Palace of Justice, and many of the theatres
churches may be mentioned as of conspicuous merit. Budapest has m
hydropathic establishments with hot mineral springs. The fairy-
Margaret Island, the property of the Archduke Joseph, but used as a pu
park, and the hilly environs of Buda are charming places of popular re

Szeged, Debreczen and Arad are the chief towns of the Great Pl
Szeged, on the bank of the Tisza, has been rebuilt and improved si
the great inundation of 1879, which destroyed the whole city. *Debrec*
a railway centre east of the Tisza, is a large provincial centre of c
merce, industry, and intellectual life. It is situated in the Hortob
puszta (steppe), the most important part of Hungary for cattle and ho
breeding. Debreczen has been termed "Calvinist Rome," as most of
inhabitants are of the Calvinist confession and the town takes a lead
part in religious affairs. *Arad* is a fine, intelligent, and commercial to
on the shore of the river Maros, which comes from Transylvania
discharges near Szeged into the Tisza. *Pozsony* (*Pressburg*) is one of
most cultivated provincial towns, and, after Budapest, the handsomest
of the country. It is situated on the Danube in a very fine position cl
to the Austrian border, and was the seat of the Hungarian Parliament u
1848, and since 1526 the place of coronation of the kings. *Kassa* is
most considerable town of Upper or northern Hungary, an ancient ro
free town, with an interesting cathedral, the finest Gothic church in
country, built in the years 1290–1382. *Székesfehérvár* (*Alba Realis*) is
most flourishing commercial town in the Trans-Danubian region (*i.e.*,
region west of the Danube), the earliest coronation and burial-place
the Hungarian kings. *Esztergom* (Latin, *Strigonium;* German, *Gran*),
the right bank of the Danube, above its great bend to the south, i
picturesque city, the seat of the Prince-primate, the ecclesiastical ch
of Hungary.

Kolozsvár (*Klausenburg*), situated on the banks of the river Szamos
the capital of Transylvania (*Erdély*), after Budapest, the first centre

llectual and public life of Hungary. It has a university, a remarkable eum, three colleges (a Roman Catholic, a Calvinist, and a Unitarian), is the seat of the Calvinist and the Unitarian bishops of Transylvania. as the birthplace of Mátyás (Matthias Corvinus), the greatest king of ngary. *Gyulafehérvár* (*Karlsburg* the Roman *Apulum*), near the river os, was the ancient residence of the princes and is the seat of the an Catholic Bishop of Transylvania.

Croatia-Slavonia and **Dalmatia** form a self-governing political inside the dominion of Hungary, and on that account bear the name *Borderland* (*Partes adnexæ*). Despite this legal and correct triple desig- on, Dalmatia, which at the beginning of the twelfth century was united Hungary by King Kálmán, now belongs only *de jure* to Hungary and Borderlands, while *de facto* it is united to Austria. Croatia was united Hungary under Kings Ladislaus and Kálmán, and King Kálmán was the , who in the year 1102 was crowned King of Croatia and Dalmatia. local government is concerned only with home affairs, religious ice and public instruction, and justice. Croatia-Slavonia has a ional Assembly of one Chamber, which consists of 90 elected depu- and of personal voters holding a privileged position. It is repre- ed in both Chambers of the Hungarian Parliament.

Zagreb (Hungarian, *Zágráb*; German, *Agram*), near the Save, is the seat he Banus (governor), of the Roman Catholic Archbishop of Croatia, and he Diet (National Assembly). It has a university, academy of sciences, eum, and a remarkable late Gothic cathedral of the fifteenth century, ntly restored after an earthquake, which damaged it seriously.

Fiume and its Territory, annexed to Hungary in 1779 by Queen ia Theresa as a separate body (*corpus separatum*), is represented in Hungarian Parliament, but administered by a special governor. The n of *Fiume* lies in the north-east corner of the Gulf of Quarnero, in the iatic Sea. It was formerly an insignificant fishing village, but since its n with Hungary it has developed into a considerable seaport and a mercial town of the first rank, a notable rival of the Austrian Triest. ne has three good harbours, one the petroleum harbour. Whitehead's edo factory, a great paper factory, petroleum refineries, and rice-mills, it considerable industrial importance. Fiume is the residence of the ernor, of the Imperial and Royal Marine Academy, and of a Royal cantile Marine Academy. The greater part of the inhabitants speak an, which is the recognised official language of the territory.

IV.—BOSNIA AND HERZEGOVINA

By Prof. A. Penck.

Bosnia and Herzegovina.—The hinterland of Dalmatia, nea the whole north-west of the Dinaric lands, is "occupied a administered" by Austria-Hungary. It is a mountainous country; t west consists of limestone, which is partially bare, and reaches at seve points to from 6,500 to 7,500 feet. Between the ridges there are numero broad basins called *Poljes*, which are drained by subterranean chann and are inundated during the wet season. In the east slates a sandstone prevail; the mountains are covered there with dense fores which extend over one-half of the country; they contain iron or and silver at several places. Coal and salt are found in broad basi along the rivers. The west, embracing Herzegovina, has a Me terranean climate in the valleys. It is drained by the Narenta to t Adriatic Sea. The east, Bosnia proper, has severer winters and cool summers; rain occurs at all seasons. It is drained by the Una, Vrb Bosna and Drina to the Sa.e, and belongs in all respects to the lands the Danube.

Bosnia and Herzegovina formed, before the conquest of the Turks separate kingdom, and from an ethnographical point of view they are s uniform. Their inhabitants belong to the Croatian branch of the Southe Slavs, but they are diversified by religion. Forty-three per cent. a Christians of the Eastern Church, called Servians; 20 per cent. are Rom Catholics, called Croats; and 37 per cent. are Mohammedans, called Tur though there has been only a very insignificant Turkish immigratic The landowners, or *Begs*, are mostly Mohammedans; the tenants, or *Kme* are Christians. This state of things has not been changed since the occ pation, but the old system of despotism has disappeared, and the count which twenty years ago had only bridle-tracks, has now an extensive n work of excellent public roads, and some narrow-gauge railways, by whi it is connected with Hungary and the mouth of the Narenta. Differe manufactures are now established; mining is going on; there are ir and salt works, and even paper mills. The population is growing rapidl and the average density of the population has increased from 59 in 18 to 68 in 1885. The exports are wood, especially oak, plums and catt *Sarajevo*, formerly called Bosna Serail, is the flourishing capital, lying a basin of the Upper Bosna, surrounded by high mountains. The chi place of Herzegovina is *Mostar*, on the Narenta.

STATISTICS OF AUSTRIA-HUNGARY.

(*Without Bosnia and Herzegovina.*)

	1880.		1890.		1900.
Area of Austria-Hungary (square miles)	240,942	..	240,942	..	240,942
Population „	37,883,609	..	41,358,880	..	45,242,889
Density of population per square mile ..	157	..	171	..	187

THE PEOPLE OF AUSTRIA-HUNGARY BY LANGUAGE (1890).[1]

	Austria.	Hungary.	Total.
erman	8,461,000 ..	2,107,000 ..	10,568,000
ech, Moravian, and Slovak ..	5,472,000 ..	1,910,000 ..	7,382,000
olish	3,719,000 ..	—— ..	3,719,000
uthenian	3,105,000 ..	383,000 ..	3,488,000
ovenian	1,176,000 ..	94,000 ..	1,270,000
rvian and Croatian	645,000 ..	2,604,000 ..	3,249,000
alian and Ladin	675,000 ..	—— ..	675,000
umanian	209,000 ..	2,592,000 ..	2,801,000
agyar	8,000 ..	7,426,000 ..	7,434,000
ypsies	—— ..	82,000 ..	82,000
Total	23,895,000	17,463,000	41,358,000

AVERAGE ANNUAL TRADE OF AUSTRIA-HUNGARY (*in pounds sterling*).

	1876–1880.	1880–1885.	1891–1895.
mports	46,861,000 ..	51,525,000 ..	55,491,000
xports	54,609,000 ..	60,448,000 ..	64,205,000

STATISTICS OF AUSTRIA.

	1880.	1890.	1900.
ea of Austria (square miles)	115,925 ..	115,925 ..	115,925
opulation of Austria	22,144,244 ..	23,895,413 ..	26,150,597
ensity of Population (per square mile)	192 ..	207 ..	226

POPULATION OF AUSTRIAN TOWNS.

	1880.	1890.	1900.		1880.	1890.	1900.
na ..	1,112,025	1,364,548	1,674,957	Triest ..	144,844	157,466	134,143
ue ..	177,026	182,530	201,589	Brünn ..	82,600	94,462	109,346
berg	109,746	127,943	159,143	Cracow ..	66,095	74,593	91,323
..	97,791	112,069	138,080	Czernowitz	45,600	54,174	67,622

THE LANDS OF THE AUSTRIAN CROWN.

	Area Sq. Miles.	Inhabitants. 1880.	1890.	1900.	Mean Density per Square Mile. 1880.	1890.	1900.
er Austria ..	7,654	2,330,621	2,661,799	3,100,493	303	347	405
er Austria ..	4,627	759,620	785,831	810,246	163	170	175
burg	2,762	163,570	173,510	192,763	60	62	69
a	8,659	1,213,597	1,282,708	1,356,494	140	148	156
nthia	3,988	348,730	361,008	367,337	88	91	92
iola	3,844	481,243	498,958	508,150	124	129	132
& Vorarlberg	11,307	912,549	928,769	981,949	80	83	86
pine lands ..	42,841	6,209,930	6,692,583	7,327,282	145	156	171
emia	20,058	5,560,819	5,843,094	6,318,697	277	293	315
avia	8,580	2,153,407	2,276,870	2,437,706	251	264	284
ia	1,987	565,475	605,649	680,422	282	306	342
ian lands ..	30,625	8,279,701	8,725,613	9,436,825	270	285	308
cia	30,307	5,958,907	6,607,816	7,315,816	196	218	241
ovina	4,032	571,671	646,591	730,195	142	161	181
rpathian lands	34,339	6,530,578	7,254,407	8,046,011	190	211	234
itime Provinces	3,077	647,934	695,384	756,546	210	225	249
matia	4,956	476,101	527,426	593,783	96	106	120
inaric lands ..	8,033	1,124,335	1,222,810	1,350,329	140	152	168

STATISTICS OF HUNGARY.

	1880.	1890.	1900.
of the Hungarian Crown Lands, square miles	125,039	125,039	125,039
ulation of Hungarian Crown Lands	15,739,375	17,709,375	19,254,550
sity of population, per square mile	126	139	153

[1] From *The Statesman's Year Book.*

POPULATION OF HUNGARIAN TOWNS.

	1880.	1890.	1900.
Budapest (without military)	360,551 ..	505,763 ..	732,32
Szeged	73,075 ..	87,410 ..	102,99
Szabadka (Maria Theresiopol)	61,367 ..	73,526 ..	82,12
Debreczen	51,122 ..	58,952 ..	75,90
Pozsony (Pressburg)	48,006 ..	56,048 ..	65,86
Zagreb (Agram)	28,388 ..	40,268 ..	61,90
Kolozsvár (Klausenburg)	29,923 ..	34,858 ..	49,29
Fiume and territory	20,981 ..	30,337 ..	38,95

STATISTICS OF THE HUNGARIAN CROWN LANDS.

	Area square miles.	Population. 1880.	1890.	1900.	Density of Popu 1880.	1890.
Hungary, with Transylvania	108,258	13,812,446	15,232,159	16,838,255	127	139
Croatia and Slavonia	16,773	1,905,295	2,200,977	2,416,304	113	130
Territory of Fiume	8	20,981	30,337	38,955	—	—

(For analysis of population according to language see Statistics of Austria-Hungary.)

STATISTICS OF BOSNIA AND HERCEGOVINA.

	1879.	1885.	1900.
Area of Bosnia and Hercegovina (sq. miles)	19,734 ..	19,734 ..	19,734
Population „ „ ..	1,158,453 ..	1,336,091 ..	1,568,09
Density of Population	59 ..	68 ..	8

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CHAPTER XIX.—THE DANUBIAN AND BALKAN STATES [1]

By Dr. A. Philippson,
Lecturer on Geography in the University of Bonn.

I.—RUMANIA

Position and Boundaries.—The great mountain chain of the rpathians on the east of Transylvania runs from north to south, turns right angles towards the west, as the Transylvanian Alps, and again vards the south at the point where the Danube breaks through it in the rge of the Iron Gates, and there the chain enters the Balkan Peninsula. e Carpathians form the western boundary of Rumania towards ngary. The country includes the low plain on the east and south, ich is physically part of the great plain of Russia. On the north the ndary is an artificial line towards Bukovina; on the east the river uth separates Rumania from Russia, and on the south the Danube is boundary towards Bulgaria. Rumania also includes the delta of the nube and the district of the Dobruja, the coast of which is a low plain, rdered by lagoons on the Black Sea. Thus the country is the gate of the lkan Peninsula towards Russia, stretching as it does from the Carpathian rrier to the Black Sea. Together with Russia it commands the mouths the Danube, and with Bulgaria the lower course of that river, the eatest channel of inland navigation in Central Europe.

Surface and Resources.—The great wall of the Carpathians, ich rises in several summits above 8,000 feet, slopes down to the manian plain in beautiful wooded declivities cut by the valleys of merous rivers fed by the high rainfall of the region. The foot-hills of cent Tertiary formation contain important deposits of rock salt and troleum springs. The province of *Moldavia* occupies the eastern foreland d forms a tableland sloping to the south, covered with the black earth the steppes, and trenched deeply by the steep-walled valleys of the reth, the Pruth and other tributaries of the Danube. The province of *allachia* occupies the southern slope from the Transylvanian Alps. It ms a low plain of pebbles and clay, which is crossed by the broad, flat lleys of rivers flowing southward or south-eastward to the Danube. e most important of these rivers is the Aluta, which rises in Tran- vania and breaks through the Transylvanian Alps. The left bank

[1] Translated from the German by the Editor.

of the Danube, which is here divided into numerous branches, fo
perfectly flat, marshy, alluvial plain, so that the river can only be appro
at a few points, and there are very few towns upon it. The rig
Bulgarian bank, on the other hand, is high and forms the site of s
towns. The higher steppe-like plateau of the Dobruja causes the D
to turn northward, and where it resumes its easterly course the d
mere wilderness of swamps, begins at once. The most important m

FIG. 162.—*The Mouths of the Danube.*

are, from north to south, those of
Sulina, and St. George; the
mouth is that used by shipping,
being overcome by engineering
The Dobruja and south-eastern
chia are mainly pastoral Steppes
rest of the Rumanian plain is
fertile, especially for grain.
hill-zone fruit and excellent wi
produced; while in the mou
cattle-rearing and forestry are
important.

Climate.—In climate, as well
soil, Rumania belongs to the regi
the Russian Steppes. The winters are very cold, the temperature ma
fall as low as −20° F.; the summers are hot, the range of temperature
great. The rainfall is small and irregularly distributed throughout the
It is heaviest in early summer (June), while the later part of summer i
dry. The mean temperature of the year at Bukarest is 51°, that fo
73°, and the extreme temperatures of the year are −6° and +94°.

History.—The Rumanian region was inhabited in ancient times
Thracian tribe called Dacians, and formed a part
of the Roman province of Dacia. When or how
the Rumanian people, who speak a language closely
allied to Latin, and call their country *Romana*,
took their rise is doubtful. Some believe that they
were originally Roman colonists, others that they
were Romanised natives of the Balkan peninsula,
who came into the country in the Middle Ages.
The independent principalities of Moldavia and
Walachia date from the thirteenth century; but later they came
the power of Turkey. During the nineteenth century Russian infl
has been gradually increasing. The efforts of the Rumanian peo
secure their independence of both Powers led, after the Crimean W
the union of the two principalities in 1859. By the Berlin Treaty o
Rumania was obliged to give up Bessarabia to Russia, but receiv
return the Dobruja, and attained complete independence of Turke
1881 it was declared a hereditary kingdom, the power of the king

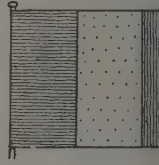


FIG. 163.—*The Ru
Flag.*

ted by a Senate and a Chamber of Deputies representing the ple.

People and Trade.—The great majority of the people belong to Rumanian nation and the Greek Catholic Church; the remainder nearly all Jews. The people live mainly by agriculture, the growing wheat and maize being most important. Cattle-breeding also occupies nsiderable part of the population; there is very little other industry pt salt-mining and the extraction of petroleum. Rumania is one of most important grain-growing countries in Europe, 73 per cent. of its rts being grain, and the rest consisting almost entirely of other farm duce. The exports, which are considerably less than the imports, go nly to Belgium, the United Kingdom, Austria-Hungary, and Germany. order of importance for imports is: Austria-Hungary, Germany, the ted Kingdom, and France. The Danube shipping trade is of great ortance to Rumania; the chief seaports are the mouths of the river, navigation of which is under the charge of an international com-sion meeting in Galatz. The Pruth is also navi-le for a considerable distance. The railway em, with Bukarest as its centre, is well de-ped. Three lines enter the country from tria-Hungary; on the west at Orsova at the n Gates; from Translyvania by the Predeal Pass oo feet high); and on the north-east from nberg through Moldavia. Two lines cross the ube to Varna and Constantsa (Kustenji), on Black Sea, with direct communication to Con-tinople; and there are also two lines into Russia.

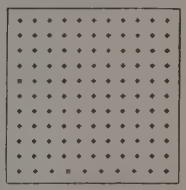


FIG. 164.—*Average population of a square mile of Rumania.*

Towns.—The capital is *Bukarest*, in the middle of the Walachian n on the small river Dimbovitsa. It is first referred to in history in the teenth century, and since the seventeenth century it has been the tal of Walachia. The town has quite a western appearance, and is ed one of the most elegant cities of southern Europe. In every ect it is the intellectual centre of the Rumanian people, possessing a ersity and other educational establishments. Eighteen forts protect capital. North of Bukarest, on the railway to Transylvania, *Ploesci* ds at the foot of the mountains. In western Walachia, *Craiova* is the t important town. In Moldavia the chief towns are the provincial tal, *Jassy*, situated near the Pruth, and *Botosani* in the extreme north. principal commercial harbours, particularly for the export of grain, *Galatz* and *Braila*, on the left bank of the Lower Danube, not far the mouths of the Sereth and Pruth. *Constantsa*, the only harbour he Dobruja, has recently acquired importance for trade with stantinople.

STATISTICS.

	1887.	1899.
Area of Rumania (square miles)	50,700	50,700
Population	5,500,000	5,912,520
Density of population per square mile	109	116

POPULATION OF TOWNS.

	1876.[1]	1899.		1876.[1]	1899.
Bukarest	221,000	282,071	Braila	28,000	58,392
Jassy	90,000	78,067	Craiova	23,000	45,438
Galatz	81,000	62,678	Ploesci	33,000	42,687

ANNUAL TRADE (*in pounds sterling*).

	Average 1870–75.[2]	1881–85.	1891–95.
Imports	3,300,000	11,700,000	15,800,000
Exports	6,000,000	8,800,000	11,900,000

II.—THE BALKAN PENINSULA

General Features.—The Balkan Peninsula is the most easte the three great peninsulas of southern Europe, and, unlike the oth united to the body of Europe along a long land boundary. In the the Dinaric Alps and in the middle the Carpathians run into the pen which is bounded between them by the Hungarian Plain, and in the east by the plain of Rumania. The boundary of the Balkan Pen can best be drawn from the Gulf of Fiume to the source of the Kulp along that river, the Save, and the Danube to the Black Sea.

From this border the peninsula stretches as a broad quadril towards the south. The Black Sea coast on the east is for the most steep, low shore, the only sharp indentation being the Gulf of Burg the middle. In the south-east it almost touches Asia Minor, separated only by the narrow river-like Strait of Constantinople ancient *Bosporus*), the small Sea of Marmora (*Propontis*), and the of the Dardanelles (*Hellespont*). The south coast in the east is fo most part low and uniform, but in the west the deeply notched mounta peninsula of Chalcidice projects and forms the Gulf of Salonica. south-west corner is formed by the peninsula of Greece which is sepa described. The west coast, facing the Adriatic, runs northward as shore as far as the mouth of the Drin; thence, north-westwards to it is mountainous, and bordered by a complicated series of long, n islands and peninsulas separated by straits and bays, and stretching f most part parallel to the coast, a formation resulting from the submergence of a folded mountain region.

The great importance of the Balkan Peninsula depends upon th that the channels separating it from Asia Minor are so narrow that it a bridge between Asia and Europe, connecting the mountain struct the continents, and interposing no barrier to plants and animals, or h

[1] These figures are estimates, not the results of a census. [2] No data for 1873.

ovements. Through its channels it commands the communication tween the Black Sea and the Mediterranean, and thus the "Eastern uestion" has acquired its importance in modern European politics.

Configuration.—Two great systems of folded mountains penetrate e Balkan Peninsula from the north; one of these, the Balkan, occupies e north-eastern part; the other, the Dinaric Alps (called after Mount nara in Dalmatia), occupies the whole western portion. Between the o extends the ancient crystalline mass of the Thraco-Macedonian ighlands, forming the nucleus of the peninsula (Fig. 165).

The Balkan Region.—The Carpathians, turning southwards after ving formed the boundary between Hungary and Rumania, are broken rough by the Danube in a long picturesque gorge between Bazias and rn Severin. The numerous rapids, the most dangerous of which is lled the Iron Gates, were formerly a serious obstacle to shipping; but the fficulties have now been removed by blasting and canalising (Fig. 158). uth of the Danube gorge the Balkan range begins as the immediate con-uation of the Carpathians, and with a similar structure runs first south-rds, and then east to the Black Sea, shutting in the Lower Danube Plain the south. The first section of the Balkans, running southward, occu-es eastern Servia; ranges of crystalline schist yielding iron, lead, and pper ore, alternate with broad, wild limestone ridges rising to 6,500 feet height. The Central Balkans, on the contrary, form a long and nearly iformly high central ridge, running eastwards, with rounded summits to 7,800 feet in height. On the north this ridge is bordered by a broad ne of parallel folded chains of sedimentary rock which become gradually ver towards the plain. These bordering heights form the third or stern section of the Balkans, after the main ridge has disappeared. ie mountains sink gradually towards the north, but break away in steep pes on the south to a series of fertile intermont basins of which the st important is that of Sofia. From the Sofia basin the river Isker flows rthward, cutting through the Balkans in a narrow gorge. South of this ies of basins several mountain masses rise parallel to the Balkan, and : named the Anti-Balkan; Mount Vitosha near Sofia is the most portant of these.

The Bulgarian Foreland, stretching from the foot of the Balkans to-rds the north, is formed of horizontal Cretaceous and Tertiary strata. vered with the fertile earth of the steppes, and well cultivated. The th-running rivers flow through deep, steep-walled valleys across the teau, which forms a high bank where it meets the Danube. From the ries on the river roads cross the tableland, and the wooded foot-hills dually rising to the great barrier of the main ridge which is crossed numerous easy but very important passes. On this account the high nk of the Danube, the valleys which furrow the Bulgarian plateau, and Balkan passes, are the natural defensive lines of the peninsula and have en the scenes of many great battles.

The Thraco-Macedonian Region.—In contrast to the your folded mountains, the relief of the ancient highlands of crystalline r in Thrace, Macedonia, and western Servia is of an extremely irreg character. Here and there rounded mountain masses rise to a g height, while in other places the land forms broad, flat, undulating hi and the whole district is so penetrated by deep basins and river val that lofty mountains are often immediate neighbours of low plains. valleys with their fertile soil naturally form the centres of cultivat and lines of communication, especially where several basins appro each other so as to form a continuous furrow. One of these wh traverses the whole peninsula from north-west to south-east is known the Diagonal Furrow. It is formed by the broad valley of the Mor flowing northwa to the river Danu through the fer hills of Servia, fr which low pas lead through basin of Sofia to great river Mar flowing to the Æg Sea through the most extensive bas of the Balkan Pen sula in the anci province of Thra The first of th is the extremely tile plain of East Rumelia, whi stretches along south of the Balka and the second is

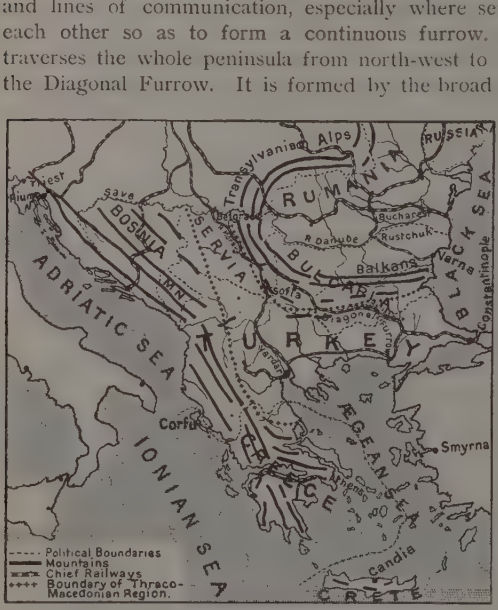


FIG. 165.—*Orographic Structure of the Balkan Peninsula.*

steppe-like basin of Adrianople, which reaches to the Marmora and Ægean Seas, and is separated from the Black Sea by the low range of the Stra hills. This great diagonal furrow was used for the old road, as it is for modern railway, from central Europe by Belgrade to Constantinople and A Minor. Another important furrow, followed by a road and railway, branch southward from the Morava valley over a low pass, and the river Vard flowing along it, traverses several basins in Macedonia to the Gulf Salonica. These two furrows diverging towards the south are the great highways of traffic and of industry in the peninsula, and in all ages th have been the sites of the greatest centres of population. Between the t stretches the wild mountainous district of the Rhodope, which in the ne reaches a height of almost 10,000 feet in the peaks of Rilodagh and Mu

lla. Upper Macedonia, west of the Vardar valley, contains the mass of hardagh, the highest summit in the Balkan Peninsula, just 10,000 feet bove sea-level. Both of these mountainous districts are intersected with umerous basins and fruitful valleys, some of which in Macedonia, articularly in the west near the Albanian frontier, contain large lakes.

The Dinaric Region.—The west of the peninsula is occupied by the road folds of the Dinaric Mountains, which, continuous with the Alps in ne north, turn south-eastward and then southward parallel to the coast rough Dalmatia, Bosnia and Herzegovina, Montenegro and Albania, into ne Greek peninsula. They consist of a great number of parallel chains or the most part of limestone formation, rising in places in jagged crests more than 6,500 feet above the sea ; and in other places showing the eculiar features of the Karst, swallow-holes and subterranean channels bounding on account of the solution of the rock. Stony and barren lateaux separated by longitudinal valleys following strips of softer chistose rocks, are characteristic features. The rivers Narenta, Drin, nd Semen, break through the chains in wild inaccessible ravines. Communication with the interior is exceptionally difficult, as a traveller from ne coast has to cross a succession of high ridges and deep valleys ; and, o add to the physical difficulties, these barren mountain lands have lways been the home of robber tribes.

The mountain barrier on the west walled in the important and easily ccessible trade routes from Hungary, Asia Minor, the Ægean Sea, and the ower Danube Plain, which have made the centre of the Balkan Peninsula channel for trade, for the passage of armies and for the migration of eoples in all ages. This central part is rich in fertile plains, and mineral esources are not wanting ; so that the country is capable of supporting dense and highly civilised population, were it not for the thousand years f confusion and misgovernment which have made it the least advanced art of Europe.

Climate and Productions.—The Balkan Peninsula exhibits several arieties of climate. The centre and the east coast, as far as the Bosporus, re intermediate between Central Europe and the south of Russia, with inters as cold and snowy as in the east of Germany or in the north of orway, the temperature often sinking below zero F. ; the summers, on ne contrary, are as warm as in the south of France. The rainfall is less n the east coast than in the interior ; June is the wettest month, but rain fairly uniformly distributed throughout the year. On the Ægean coast ne climate is that of the Mediterranean, with mild winters like those of the outh of France ; the rainfall, especially on the south-east, is small, with a aximum in autumn and winter. The greatest contrast occurs between ne interior and the west coast, which is exposed to the warm winds from e Adriatic and protected by mountains from the north-east ; the average nuary temperature, in the same latitude, is about 7° F. higher on the west an on the east. The rainfall on the Adriatic coast is heavy at all seasons,

especially in autumn. The typical Mediterranean vegetation of evergr shrubs, olives, figs, oranges, and lemons, is luxuriant along the whole v coast, very poorly developed in the south, and altogether wanting in interior, where the forests and fruits of central Europe take its place, the east, particularly in the Adrianople Plain, there are steppes like thos Asia. The Balkan Peninsula is also a meeting-place for European, M terranean and Asiatic animals; the wolf and bear are at home on mountains, the jackal prowls over the southern plains, herds of buffa and Oriental fat-tailed sheep graze beside the ordinary European cat but the camel has now almost disappeared.

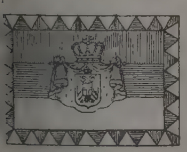
People and History.—In ancient times the Balkan Peninsula occupied by two Aryan races, the *Thracians* in the east and the *Illyrian* the west; the Vardar Valley between them was the dwelling-place of *Macedonians* of mixed Illyrian, Thracian and Grecian stock. The *Gre* who settled on the coast as sailors and traders, gradually spread over south-east of the peninsula as far as the Balkans, introducing the Gr language and culture, although Latin was afterwards adopted in the no Under Roman and Byzantine rule the land prospered greatly, and in time of the Eastern Roman Empire, Constantinople became the n renowned city in the world through its trade and industry. In the seve century the *Slavs* from the north, pressing upon the declining empire, dr the Greeks back to the coast, the Romans into the distant mountains, the Illyrians (the present Albanians) into the south-west of the penins These Slavs consisted essentially of two peoples, the *Servians* in the w and the *Bulgarians* in the east: both accepted Christianity in the ni century and gradually raised themselves out of barbarism into civilisat The Bulgarians by the fourteenth century had made themselves master the whole peninsula, and were then conquered by the Servians, but th short supremacy was brought to an end by the invasion of the conquer *Turks* before whom the Byzantine Empire fell in 1453, and Servia in 1. The heavy rule of the Turks put a stop to progress, and the subject peop sunk into ignorance and barbarity, except on the north-west coast wh Dalmatia remained in the possession of Venice and later passed to Aust Comparatively few Turks settled in the interior, but many of the natives w perverted to Mohammedanism. In the course of the nineteenth cent the oppressed nationalities were roused, with Russian help, to throw off Turkish yoke, or to acquire some measure of independence. The pres political condition of the peninsula was determined by the Treaty of Be which followed the last Russo-Turkish War in 1878. The Balkan Penins was by it divided into five States. (1) The north-western part of the Dina Mountains, including *Dalmatia, Bosnia,* and *Herzegovina,* attached Austria-Hungary. (2) The small independent principality of *Montene* to the south. (3) On the east the kingdom of *Servia* around the Mor valley. (4) The principality of *Bulgaria,* under the suzerainty of Sultan, occupying the north-eastern part of the peninsula on both side the Balkan Mountains. (5) The *Ottoman Empire,* or Turkey, in the sou

The ethnographical boundaries do not correspond with the political. he Servians occupy the north-west, the Bulgarians the east, and Slavs f doubtful origin Macedonia. The ncient Albanian people remain y themselves in the south-west. Many Greeks live on the coast, and, ith the Armenians, are settled as erchants in all the towns. Jews, escended from those who were xpelled from Spain in the fifteenth entury and still speaking Spanish, so occupy the towns as trades- en and merchants. The Turks e numerous only in Constanti- ople ; they live in small groups in hrace, Bulgaria and Macedonia, nd elsewhere as Government ficials and soldiers. The Balkan Peninsula is thus the theatre of merous races and religions, the adherents of which live in an atmosphere fanatical hatred and political rivalry.

FIG. 166.—*The Shrinking of Turkey in Europe.*

III.—SERVIA

History.—The Servians were the first of the Balkan peoples to recover eir liberty from the Turks. As early as 1817 the land on both sides of the ower Morava was formed into a principality under Turkish suzerainty, but e Turks occupied the fortresses till 1867. Repeated wars and internal ubles, the struggle between the dynasties of Karageorgevich and renovich, ending in the victory of the latter, hindered the progress of the country. The Berlin Congress at last secured complete independence to Servia, and an important increase of territory in the south, including the upper reaches of the Morava above Nish. Immediately afterwards, in 1882, it was declared a kingdom, the power of the king being limited by a popularly elected Parliament, the Skupchina.



G. 167.—*The Servian Flag.*

Configuration.—Servia is separated on the rth by the Save and Danube from Hungary and Rumania, on the west the Drina from Bosnia, while the boundaries on the east and south merely arbitrary lines drawn towards Bulgaria and the district still own as Turkish Old Servia, which was the nucleus of the Servian Empire the Middle Ages. The east of Servia lies on the rugged chains of the lkans, and is therefore very thinly inhabited, although containing copper,

lead, and iron at Maidanpek, and coal near Cuprija. The highlands crystalline rock in the south include the Kopaonik Mountains, rising 7,000 feet; but western Servia consists of a hilly district of your Tertiary strata, which extends to the Hungarian Plain. The hills covered by beautiful oak forests interspersed with fertile fields. Morava Valley, the great artery of commerce through the peninsula, its tributary valley of the Western Morava, forms the best part of country. The central position of this valley, commanding the entranc the Balkan Peninsula from central Europe, to s degree compensates Servia for being completely s out from the sea.

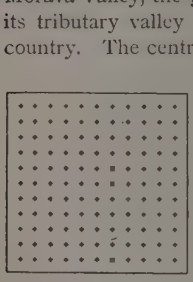


FIG. 168.—*Average population of a square mile of Servia.*

Resources and Trade.—Servia is the n fertile and densely peopled of the Balkan States, the want of tranquility and diligence amongst people, and the violence of party strife in poli lead to maladministration and retard the progres the country. Only 18 per cent. of the surface is tivated, yet the people depend almost exclusively u agriculture and the rearing of live stock, particul of swine in the great oak forests. The exports, pri pally of swine, fowls, dried plums (prunes), wheat, maize, and other f products considerably exceed the imports of manufactured goods, and external trade is practically with Austria-Hungary alone. Except for undeveloped mines, there is no other industry in the country. Mean communication stand sorely in need of improvement; the roads are b and the railway system is confined to the lines from Belgrade to Nish, thence to Constantinople and Salonica, with a few unimportant branc River trade, on the other hand, is important both towards central Eur by the Save and Danube, and towards the sea by the latter river. education of the people, who are practically all of Servian race, belong to the Greek Orthodox Church, still leaves much room for provement.

Towns.—*Belgrade*, the capital, is situated in a splendid position on a at the confluence of the Save and Danube, not far from the mouth of the Morava, and thus it commands the great artery of traffic between central Europe and the peninsula. It was formerly of great importance as a fortress, and was the scene of many battles in the Turkish wars. It now concentrates the national life of Servia; it contains the Servian University and Government buildings, but it is by no means a handsome town. The railway junction *Nish* on the Upper Morava is the only ot town that requires to be mentioned.

FIG. 169.—*Belgrade.*

STATISTICS.

	1890.	1900.
Area of Servia in square miles	18,650 ..	18,650
Population	2,162,759 ..	2,493,770
Density of population per square mile	116 ..	134
Population of Belgrade	54,249 ..	69,097
„ „ Nish	19,877 ..	24,451

ANNUAL TRADE OF SERVIA (*in pounds sterling*).

	1871–75.	1884–88.	1891–95.
Imports	1,200,000 ..	1,600,000 ..	1,500,000
Exports	1,300,000 ..	1,500,000 ..	1,900,000

IV.—MONTENEGRO

Position and Surface.—On the stony limestone mountains which se above the steep coast of southern Dalmatia, the Black or Barren Mountains (*Montenegro* in Italian, *Chernagora* in Slavonic), a small and very poor ibe of the Servian race has always maintained its independence against oth Turks and Venetians, and through their warlike spirit and frequent ids the clansmen have made themselves feared by the surrounding eople. The nucleus of the little State is an elevated, stony, limestone gion, a portion of the Karst, with a raw climate and possessing only a w patches of cultivable land scattered amongst the poor pastures. The atural entrance is by the steep ascent from the deeply cut Bay of Cattaro, hich, however, is in Austrian territory. In the north-east the Karst lateau is dominated by huge limestone mountains exceeding 8,000 feet in ight, and cleft by profound gorges, which form the boundary towards urkey. In the south-east a well-watered and wooded schistose range, e Brda, rises to a similar height. By the Treaty of Berlin in 1878 the rtile and warm low plain of the river Zeta and the north shore of the ake of Scutari, into which it flows, as well as a strip of coast west of this ke containing the harbours of Antivari and Dulcigno, were added to ontenegro.

People and Trade.—On the low ground maize, fruit and wine are ltivated, but most of the Montenegrins, a tall, powerful and honest moun- in people, make their living by cattle-rearing. The very small export trade almost entirely with Austria-Hungary, and consists of products of the stures. Many Montenegrins emigrate as workmen to other countries. ne State, like the people, is very poor, and can only exist through the help Russia. There is absolutely no industry, and in spite of all attempts at provement, roads, commerce, and education are in a very backward ate ; there are no railways at all. The hereditary Prince is an absolute onarch ; every man serves in the army in time of war, and almost all long to the Greek Orthodox Church.

The area of Montenegro is only 3,500 square miles, and the population out a quarter of a million. The capital, *Cetinje* (Cettigne), situated on the ateau not far from the Bay of Cattaro, and the larger town *Podgoritza*, the Zeta, are little more than villages.

V.—BULGARIA

History and Constitution.—The national life of Bulgaria recove
later than that of Servia. It was only in the second half of the n
teenth century that the Bulgarians began to try to escape from Tur
tutelage and from the influence and guidance of the Greek nat
and to found a national church, schools and literature. The Ru
Turkish War secured to the principality of Bulgaria an autonom
government under Turkish suzerainty, and the Treaty of Berlin in
defined it as the land between the Danube and the Balkans, together
the Sofia plain and its surrounding mounta
The autonomous province of Turkey, East
Rumelia, formed at the same time, has b
treated as an integral part of Bulgaria since 1
The whole country is governed constitution
the Sobranye, or parliament, being elected by
people.

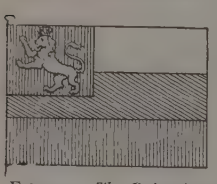


FIG. 170.—*The Bulgarian Flag.*

Surface.—The form of the country is tha
a rectangle directed from west to east, from Se
to the Black Sea. The Danube divides it on the north from Ruma
except the Dobruja. On the south the frontier follows the hills wh
separate the plains of Eastern Rumelia and Adrianople, and zigzags ac
the northern Rhodope. The chain of the Balkans divides Bulgaria
two large parts—the Danubian-Bulgarian plateau in the north, with
extreme and dry climate but good soil for grain-growing, and the
girdled basins in the south. To the west a group of high valley ba
with a raw climate surround the central Sofia basin. The eastern gr
of basins south of the Balkans, especially the Eastern
Rumelian Plain, through which the Maritza flows,
is warm, well-watered, and fertile, forming the best
part of the country. The Rilodagh and other moun-
tains south of the fertile zone are wild and thinly
peopled.

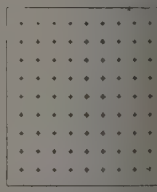


FIG. 171.—*Average d
ulation of a sq
mile of Bulgaria*

People and Trade.—Bulgaria is the strongest
and most settled of the Balkan States, in spite of
some troubles resulting from past centuries of
misgovernment. A keen desire exists amongst
the people to annex the neighbouring part of
European Turkey inhabited by Slavs, especially Macedonia; hence
national interests conflict with those of Servia, Greece and Aust
and necessitate the maintenance of a large standing army. Thr
quarters of the population are Bulgarians belonging to the Greek Ort
dox Church, which is established under a separate Exarch. Ab
half a million Turks still remain in the east of the country, but
number is being reduced by emigration, and the Greek element is

erable in the coast towns. The population is not yet nearly so dense as fertility of the land can support, and consequently the peasants are in y circumstances; yet they are steadily improving their methods of riculture. Maize and wheat are grown in Danubian Bulgaria; in stern Rumelia rice, cotton, wine, and fruit, particularly plums, are also tivated. Silk-growing is a feature of this district, and the cultivation of es is carried on to a very large extent for the extraction of the typical iental perfume, attar of roses. Sheep, goats, many cattle and buffaloes kept. The woods on the mountains yield excellent timber; and the ter-power is utilised for industrial purposes, particularly wool-weaving d small ironworks. The mineral resources are insignificant. External mmerce is more developed than in Servia, the exports consisting chiefly of ain, particularly wheat, pastoral products, and attar of roses; it is carried principally with Turkey, the United Kingdom, Germany and France. e imports are principally manufactured goods from Austria-Hungary, United Kingdom, Turkey, and Germany. The Danube and the fairly od harbours of Varna to the north and Burgas to the south of the Balkans cilitate external trade. Numerous roads traverse the country in all rections. A railway connects Rushchuk on the Danube with Varna, and branch from the great Orient railway, which traverses the Diagonal rrow, reaches Burgas. A line in course of construction from Sofia rough the Isker valley will be the first railway to cross the Balkans.

Towns.—The capital, *Sofia*, is situated in the basin between the osh Mountains and the Balkans, at an important meeting-place of ads. It is very ancient, but has only begun to flourish since the in-pendence of the country; it has been completely rebuilt after the le of a Russian town. *Philippopolis* is picturesquely built on an iso-ed basaltic height overlooking the Maritza in the middle of the Eastern melian Plain. A series of fortified towns along the high bank of Danube command the ferries. *Rushchuk* is the most important, but *lin* and *Silistria* have played a great part in military history. *Plevna* in east of the Bulgarian plateau was, from its commanding position, the ne of the decisive battle in the last Russo-Turkish War.

STATISTICS.

	1893.		1900.
Area of Bulgaria (square miles)	37,282	..	37,282
Population of Bulgaria	3,309,816	..	3,733,189
Density of population per square mile	89	..	100
Population of Sofia	47,000	..	67,920
" Philippopolis	36,000	..	42,849
" Varna	28,000	..	33 443
" Rushchuk	28,000	..	32,661

ANNUAL TRADE (*in pounds sterling*).

	1880–84.[2]		1891–95.
Imports	1,900,000	..	3,300,000
Exports	1,600,000	..	3,100,000

It is to be noted that in commercial reports, throughout the East generally, Austria-gary is credited with a considerable amount of export trade which really consists of nan goods sent by rail into the Balkan Peninsula (or by Triest).

Before the annexation of Eastern Rumelia.

VI.—EUROPEAN TURKEY

Position and Surface.—The centre of gravity of the Otto Empire now lies entirely in Asia, only the crumbling ruins of for great possessions remain in Europe. It includes the greater part of Minor, Syria, Mesopotamia, parts of Arabia, and exercises suzerain ri over Tripoli and nominally over Egypt and Cyprus. European Tur now (Fig. 166) occupies a narrow strip of the Balkan Peninsula betw Bulgaria and the Ægean Sea, the southern part of ancient Thrace, an the west a triangular area including Macedonia, Old Servia, and Alba reaching to the Adriatic and bordered by Servia, Bosnia, and Montene in the north, and by Greece in the south. The western portion Turkey is so shut in by the Rhodope Mountains from eastern Thr that the two are only put in communication by the plain along the co The provinces have no common interests, they are peopled by a mix of races, amongst which the Turks are in a minority, and they are held together by the force of arms and the jealousy of the Great Pow While the possession of the straits and the proximity of Asia Minor do nate the eastern part, and have led to it becoming the centre of both Byzantine and the Ottoman Empires, the Vardar valley in west Turkey supplies the line of communication between central Europe the Ægean Sea. The possession of the straits as an outlet for its Bl Sea fleet is a great desideratum for Russia, and the control of the Var valley is of equal importance to Austria. The Greeks look upon Epirus western Macedonia as belonging by right to Greece; in Albania, Austr and Italian interests oppose each other, and are met by the ambition the inhabitants for an independent Albania.

People, Government and Trade.—In spite of many reforms details the methods of Turkish government remain essentially Oriental, and foreign to mod principles. The Sultan is absolute master of land and the people, his ministers and officials be responsible to him alone. Only Mohammed possess civil rights, small as these are in suc State, and they have to bear the whole he burden of military service. The Christian po lation is practically without rights. The Turk administration shows by the arbitrary conduct, the acceptance of bribes, the entire want of method on the part of the frequently changed offici that it has never understood, and still does not understand, how to uti or develop the rich resources of the country. The population lives alm exclusively by agriculture and cattle-rearing, very carelessly carried out leaving much of the land unutilised. Almost all the land belongs to crown, the church, or to large proprietors; the peasants live in deepest poverty and ignorance, oppressed by heavy taxation. The ch

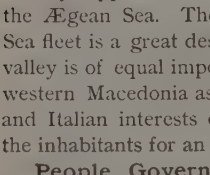


FIG. 172.—*Turkish Naval Ensign.*

roductions are grain, maize, flax, hemp, cotton, tobacco, silk, wine, and, on ıe coast, olives. Oxen and buffaloes are used as beasts of burden and for rm-work. The forests have been nearly destroyed, and are very badly ıanaged. There is practically no industry except hand-loom weaving and rtisan's work. Most of the trade in the towns, and almost all the shipping re in the hands of Greeks and Armenians, or of foreigners who enjoy the reat privileges of freedom from taxation, and the protection of their consular ourts. The roads are so bad and so little developed that large districts are ıable to place their products on the market. Yet ere are now a few important railways, including e lines from Belgrade by Sofia to Constantinople ıd to Salonica, and the line along the coast from onstantinople to Salonica and Monastir, and that om Uskub to Mitrevitza. The postal and telegraph stems are undeveloped and so unsatisfactory that e Great Powers have their own post-offices in e large towns. In spite of the exceptionally vourable geographical position of European Turkey, political conditions ıve prevented any developments of transit trade or shipping. The chief ports are grain, beans, fruit, honey, wax, wine, tobacco, wool, attar of ses, also carpets, arms, and leather goods. The chief imports are xtiles, colonial wares, wool and coal, rice, petroleum and iron. The nited Kingdom, France, Austria-Hungary, and indirectly Germany, have ıe chief trade with Turkey.

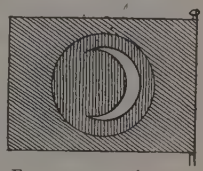
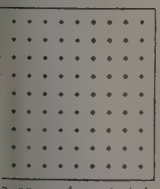


FIG. 173.—*Turkish Merchant Flag.*

The population consists in nearly equal parts of Turks, Greeks, lbanians, and Slavs (Bulgarians and Servians), and also a certain number of Rumanians, Jews, Cherkesses, Armenians, and Gypsies. About half the population are Mohammedans, including the Turks and Cherkesses, most of the Albanians and some Bulgarians. The rest are principally Greek Catholics, and were formerly under the Greek Patriarch at Constantinople, but now most of the nationalities have a separate form of Church government. None of the Turkish statistics can be viewed as trustworthy, and all figures must be looked upon as mere estimates. The country is divided into a number of *vilayets* or ovinces, the boundaries of which are arbitrarily drawn and frequently anged.



3. 174.—*Average population of a square mile of European Turkey.*

The Bosporus.—The Bosporus forms the focus of the shipping routes tween the Black Sea and the Mediterranean, and of the land routes between irope and Asia Minor. It is a winding, river-like valley with picturesque ›pes leading up on both sides to a level-topped plateau of schistose rocks. strong current flows through it from the Black Sea to the Mediterranean, d the depth is more than sufficient for the largest ships. The beautifully

wooded and cultivaed banks are lined with towns and villages, castles parks, ancient towers and modern forts which can stop the passage hostile fleet. In contrast to the rich fertility of the banks the platea bare and desolate. The southern end of the Bosporus is the great centr population, and here the world-famous city of *Constantinople* surrounds narrow curved inlet of the Golden Horn which forms a magnific harbour on the European side, and the coast of the Sea of Marmora bou a triangular hilly peninsula on which the Greek colony of Byzantium founded about 700 B.C. The Roman Emperor Constantine, changing name to Constantinople, made it the capital of the Roman Empire ; an the metropolis of the Eastern Empire it became in the Middle Ages the n splendid and richest town in the world, the great meeting-place of E

FIG. 175.—*The Bosporus.*

and West. The glory of those day still recalled by the incomparable chu of St. Sofia, now a mosque, the great walls and other buildings. When Turks conquered it in 1453, "Stamb lost much of its commercial value, bu has always continued to be the centre the Islamic as well as of the Greek Ori Its beautiful mosques with their mina commanding magical views of the the bazárs, the public wells, the mu farious street life, give to the town e yet a purely Oriental aspect. Here Turkish element preponderates as Greek does in the adjoining suburb *Phanar.* On the contrary the suburb *Pera* and *Galata* on the northern side the Golden Horn are quite European appearance, and form the modern co mercial city. *Scutari* on the opposite s of the Bosporus is entirely Turki Altogether these towns contain about a million inhabitants, half of th Mohammedans, the other half almost equally divided between Armenia Greeks and foreigners, most of whom are Greek subjects ; about 5 per c of the population are Jews. On the wider and less picturesque strait of Dardenelles, also protected by numerous forts, stands the harbour *Gallipoli.*

Eastern Turkey.—Compared with the neighbourhood of the str the whole of Eastern Turkey, the vilayets of Constantinople and Adr ople, are thinly peopled, except on the notable Maritza river which flo through a very fertile valley. Where it enters the hill-girdled plain, a is rendered navigable by the junction of important tributaries, at intersection of the Diagonal Furrow with the roads from the Bal

asses, the town of *Adrianople*, the most important military post of uropean Turkey, has its site. *Dede Agach* is the harbour of the aritza region, exporting grain on the Ægean Sea. From this point the ilway to Salonica passes along the low coastland which, like the off- ing islands, is mainly inhabited by Greeks. The Rhodope Mountains the north are inhabited by wild Pomaks or Mohammedan Bulgarians. ne island of Thasos, although the nearest to Europe, is politically part Egypt, while Samothrace, Imbros, Lemnos, and Strati, belong to sia.

Macedonia.—Macedonia, including the vilayet of Salonica and part Monastir, is the best part of European Turkey. It contains many rtile hill-girdled plains; and in the south-east gold and silver were rmerly mined, but the mineral resources are not yet properly utilised. ne principal products are grain, tobacco, and, on the coast, olives. n the coast and in the south-west the people are Greeks; elsewhere the ıvs predominate, with a sprinkling of Greeks, Turks, Rumanians and ws, and the strife of races is very acute. The important seaport of *lonica*, inhabited mainly by Spanish Jews, stands at the outlet of the great rdar valley. The other towns of importance are *Seres*, in the east, and *tolia*, in the fertile high basin of Monastir in the west.

Old Servia, or the vilayet Korsovo, between Macedonia, Albania, Monte- gro, Bosnia, Servia and Bulgaria, on the upper tributaries of the Vardar, orava, Drina, and Drin, contains an alternation of fertile hill-girdled lleys and high mountains. In this district Albanians, Servians and ılgarians struggle and intrigue for supremacy, and on account of its com- ınding geographical position it is of exceptional political importance. The rth-western part forming the Sanjak (district) of Novi-Bazar, between rvia and Montenegro, is in the military occupation of Austria-Hungary. ıe chief towns are *Prisrend*, at the northern base of the Shardagh and *kub* on the upper Vardar, where the roads from Servia, Bosnia, and ntenegro to Salonica converge.

Albania.—Albania, comprising the vilayets of Scutari, Janina, and part Monastir, is a wild and inaccessible mountain-land descending on the st to a swampy and unhealthy coastal plain. Epirus, which belongs physi- ly to the Greek Peninsula, and is inhabited almost exclusively by Greeks, included in Albania, and has quite a similar character. The Albanians a warlike and very uncultivated people, whose speech has never up to dern times become a literary language; they are divided into several es at enmity with each other, and many fall victims to family feuds and vate vengeance. The authority of the Turkish jurisdiction is confined to larger towns. The people are in almost equal parts Mohammedans, ek and Roman Catholics—a fact which places a very serious obstacle the way of independence for Albania. The resources of the land are ll, consisting of cattle-breeding in the interior, and olive culture in the st. The principal towns are *Scutari* in the north on the Drin, not far

from the coast and close to Lake Scutari, and *Janina* in the interior. ancient times the harbour of Dyrrhachion (Durazzo) and Apollo (Valona) carried on a great trade with Italy, but there are no Alban harbours of modern importance.

STATISTICS (*estimates*).

Area of European Turkey in square miles	65,508
Population	5,864,000
Density of population per square mile	89

POPULATION OF CHIEF TOWNS.

Constantinople (with suburbs, 1885)	874,000	Gallipoli	30,000
Salonica	150,000	Janina	30,000
Adrianople	71,000	Seres	25,000
Monastir	50,000	Skutari	20,000
Prisrend	40.000	Uskub	20,000

THE OTTOMAN EMPIRE (*estimates*).

	Area in square miles.	Population.
Turkey in Europe	65,600	5,864,000
Anatolia (Asia Minor)	200,000	9,000,000
Armenia and Kurdistan	89,200	2,457,000
Mesopotamia	100,200	1,350,000
Syria	115,100	2,677,000
Arabia	173,700	6,000,000
Tripoli	398,700	1,300,000
Ottoman Empire	1,142,500	28,648,000

Bulgaria, Bosnia and Herzegovina, Samos and Egypt are also considered to form part o Sultan's dominions.

VII.—GREECE

Position and Boundaries.—The Greek Peninsula stretches so ward from the south-west corner of the Balkan Peninsula between Ægean and the Ionian Seas. The coast, which is almost everywh mountainous, is deeply indented by great gulfs and by innumerable s bays which form a great number of excellent harbours. The countr divided by gulfs on oppo coasts into three parts, North Greece, Central Greece and Peleponnesus; the last name connected only by the low narrow Isthmus of Corinth, ac which the Gulfs of Corinth Ægina are now united by a canal. Numerous islands di sify the Ægean Sea; the sail passing from Greece to Asia M has always land in sight. The Ionian Islands lie along the west c While the barren mountains of the Balkan Peninsula effectually shut Greece from overland trade, its position is exceptionally favourable traffic by sea.

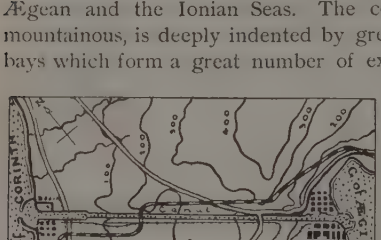


FIG. 176.—*The Isthmus of Corinth Ship Canal.*

Surface.—The Greek Peninsula is filled with the continuation of

ountain systems of the Balkan Peninsula (see Fig. 165). The folds of the inaric Mountains, with their long, parallel limestone ridges, separated by oughs of sandstone and schists, run through the west of the region, and e closely bordered by the wild Pindus range, which divides Greece as far the Gulf of Corinth into definite eastern and western parts. The Dinaric ountain system also occupies the Ionian Islands and the greater part of the eleponnesus, where Mount Taygetos reaches the height of 7,890 feet, and nally it turns and runs in a curve of islands towards Asia Minor, shutting the Ægean Sea on the south. The north-east of Greece is traversed by e continuation of the crystalline rocks of Thrace and Macedonia, which nild the mountains of Thessaly, including the fabled mount of the gods, lympus (9,800 feet). The east of Central Greece, Eubœa, and north-eastern eleponnesus are, on the contrary, mainly occupied by mountain chains of esozoic limestone stretching in curves from west to east; the best-known n nit of these mountains is Parnassus, rising in the very heart of Greece the height of 8,060 feet. The Cyclades stretching to the east of the eleponnesus are occupied by less abrupt and lower mountains of crystal-ne formation.

The steep and rugged highlands of Greece are cleft by many irregular epressions or rifts, the floors of which are sometimes occupied by the a, sometimes by fertile plains or hilly ground. Strong earthquake shocks hich originate in them often cause great destruction. Many of these sins are drained by subterranean channels in the limestone; these metimes get blocked and lead to the formation of lakes, which frequently sappear again after some years, but are often permanent. Although the tle mountain-girdled plains take up but a small part of the area of the untry, they have in all ages been the centres of culture. In this nall region the sharpest physical contrasts are crowded together; ld mountains and sterile limestone plateaux rise close to fertile plains d tranquil inlets of the sea. While this arrangement gives much riety and beauty to the landscape and is favourable for seafaring and to me extent for mining, it leads, on the other hand, to a low general erage of productiveness and to the subdivision of the country into a mber of separate provinces.

Climate and Vegetation.—On the low grounds Greece enjoys the pical Mediterranean climate, hot and almost rainless summers with warm d rainy winters, although frost and snow are not entirely unknown. The nfall is considerable in the west but small in the east, where the drought often excessive; there are few permanent streams, and in summer all ass and vegetation on the plains wither. Artificial irrigation is conse-ently necessary for successful fruit-growing. In the mountains rain falls summer and much snow in winter. The vegetation of the plains con-s principally of evergreen shrubs and occasional fir and oak woods. In mountains there are some fine forests of conifers and oak, but at great ights the vegetation assumes an Alpine character.

History and People.—From the dawn of authentic history Gre has been inhabited by the *Hellenic* people (*Græci*, Greeks) a branch the Aryan family. The intellectual supremacy of Greece in antiquity the foundation of modern civilisation, and, from the material point of vi was not due only to the careful utilisation of the manifold though not r resources of the country by a highly gifted people, but also to the situation of Greece for the trade of the early world between the anci civilised countries of Asia and the newly opened lands of the western M terranean. Side by side with the commercial, there was a great indust development, and Greek merchants and sailors spread the culture of t people by founding colonies in every part of the then known wo During the last centuries of antiquity Greece lost its importance more more on account of changes in trade routes; while political subdivis and the small fertility of the land led to its gradual impoverishment depopulation. In consequence of the destruction of woods and allow the land to lie fallow, much of the soil was washed away by the he rains of winter and the old harvest-fields became useless. The inroads barbaric tribes, the endless wars of the Middle Ages, and lastly tyranny of the Turks completed the ruin of the land. Yet Greece all al retained a certain importance in the trade of the Levant, and Venice some of the best of the Greek islands and harbours on the coast for turies against the Turks. In the course of the Middle Ages many S and Albanians settled in the mainland, and many Italians on the islan but all of these gradually became assimilated with the original Greek speech and habit, until now only a few of the Albanians speak t original language.

The reawakening of the Hellenes began late in the eighteenth cent and culminated in the spirited war of independence from 1821 till 1829. result was the creation of the kingdom of Greece which contained the Peleponnesus, Central Greece, Eubœa and the Cyclades. In 1864 Ionian Islands were ceded to Greece by the United Kingdom, and the Tr of Berlin in 1878 extended its territory to the north so as to include greater part of Thessaly. The northern boundary of Greece is now a starting from the Gulf of Arta in the west, following the Arta river no wards, then crossing the Pindus and the low ranges of Thessaly to southern base of Olympus; it does not coincide with the natural front which should run from Cape Akrokeranian to Olympus and include whole of Thessaly and Epirus. Crete and other neighbouring isla belonging geographically and ethnographically to Greece are also outs its limits. The Greek people indeed are scattered over all the isla and the coast of the Balkan Peninsula and Asia Minor.

Government.—The population is almost entirely Greek; it inclu only about a quarter of a million Albanians in the east of Central Gr and the north-east of the Peleponnesus, and a few Rumanians northern Greece The Greek Orthodox Church includes almost the w

ople; it is an independent national church under a Metropolitan in ens. Education is well cared for, and the number of illiterates is aller than in any other part of eastern or southern Europe. The governnt is that of a very free constitutional monarchy, the parliament being sen directly by the people. Party strife, frequent changes of ministry l officials, do serious harm; yet, in spite of the great weakness of the ernment, the country has made immense progress since its indepen· ce, and the Greeks are the best-educated people l the highest in culture in the Balkan States.

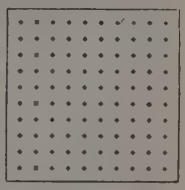
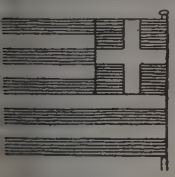


FIG. 177.—*Average population of a square mile of Greece.*

Resources and Trade.—Agriculture is the ncipal resource of the country, although the ount of cultivable land is small (only about 18 per t.), the warm plains are of extraordinary fertility. e condition of the peasants is very good, except Thessaly where large estates are the rule. Grain maize are not produced in sufficient quantity to et the home demand, but wine, olives, tobacco fruit give an abundance for export, and some ton and silk are also produced. The fruit most important in trade is the rant (the name is a corruption of *Corinth*) which is produced only in ece and mainly in the west. The rearing of live stock, principally ep and goats, the wasted forests and the fisheries do not yield enough home needs. The only important products of the sea are bath sponges. rion, in Eastern Attica, is an important mining district; emery is ained in the island of Naxos, and inferior lignite occurs in Greece. No at industrial development is possible on account of the want of coal, er-power and capital.

The merchant fleet is important and carries on a great part of the trade he eastern Mediterranean; and the foreign trade of Greece itself is considerable. One-half of the value of the exports consists of currants, then follow lead and zinc ores, wine, oil, tobacco, figs, sponges and valonia (acorns). The exports go principally to the United Kingdom, France, Austria-Hungary and the United States; the imports, consisting mainly of grain, manufactures of all kinds, wood and fish, come chiefly from the United Kingdom, Russia, Turkey and Austria-Hungary. Traffic is mainly by sea ng the coast; the roads, formerly for the most part mere mule-tracks, being improved; and railways are also being developed. The only s of importance are one from Athens across the Isthmus of Corinth to Peleponnesus, where it branches to the west along the coast to Patras, to the south. There are two lines in Thessaly, and a few local ways. Post and telegraphic communication are, however, well pro·d for.



G. 178.—*The Greek Merchant Flag.*

Northern Greece.—Northern Greece includes the wild mou district of the Pindus, except Turkish Epirus, inhabited by poor and s times predatory herdsmen, and Thessaly to the east, the mountai which surround the largest and most fertile plains of Greece. The la comparatively ill-cultivated and thinly peopled, as it was only recently from Turkey. Still, since that time the province has made surpr strides as the flourishing condition of its towns, *Trikkala* in the interio *Volo* on the coast demonstrated before the last war, in 1896, had a thrown the province back.

Central Greece.—Central Greece, although mainly mountainou the west, contains some fertile plains where currant-growing is carrie in Ætolia. The chief harbour of the district is *Missolonghi*, lying on a lagoon, and renowned for its heroic defence during the war of indep ence, and for the death of Lord Byron whose verse celebrated the re of Greek nationality. On the east there are some rich inland plains, ticularly in Bœotia, one of which contained the recently drained lake Ko

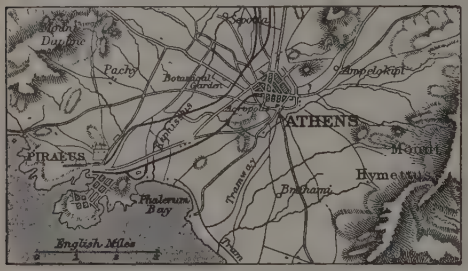


FIG. 179.—*Athens and the Piræus.*

Cotton is largely vated in this dis *Thebes*, the old capit Bœotia, is now mer village. The large m tainous island of Eu is celebrated fo wine-growing, and separated from the m land by the very na Strait of Euripus. south-eastern extre of Central Greece, which projects as a peninsula, only shelters small s plains between its mountains, which are low and barren, although ri marble and ores. Six miles from the sea, in one of the little plains ope southward on the beautiful island-studded Gulf of Ægina stands *Athen* city which in ancient times embodied the highest development of G culture. Its material prosperity depended upon its position in the c of the Greek world on the most important trade route which traverse Gulfs of Ægina and Corinth uniting the trade of the Ægean with th the West. After a long period of obscurity Athens is now once mor centre of the whole Greek nation. The brilliant and beautiful ci entirely modern, but built round the steep, rocky hill of the Acropolis its splendid world-renowned ruins. Museums, educational establishm including a university and a polytechnic, and other fine public build adorn the capital, while trade and industry have their seat around excellent natural harbour of the Piræus which now forms a subur Athens.

Peleponnesus.—The Peleponnesus, approached from Central G

the Isthmus of Corinth, contains in the luxuriant plains of the north and st coasts the richest part of Greece; the districts of Achaia, Elis and ssenia producing the greatest crops of currants, which are exported nly from the harbour of *Patras* in the north-west. The plains of onia (Sparta) in the south-east of Argos, and Corinth in the north-east e important centres of ancient culture; but the towns now known by se names are of small importance. The highland district of Arcadia he interior also contains some fertile land.

The Greek Islands.—The *Ionian Islands*, Corfu, Leukas, Cephalonia, aca, Zante and Cythera are all mountainous in the middle, but round the ghts there are zones of hilly land and plains of extraordinary produc- ty in currants, wine and fruit. A large part of the Greek merchant pping belongs to these islands. The good government which they g enjoyed under the Venetian Republic and the United Kingdom es its mark in their well-ordered affairs. The town of *Corfu*, with its ndid harbour, is specially engaged in the trade with Italy and Austria. The Greek Islands in the Ægean Sea are on the whole of small fertility, the *Cyclades*, particularly Naxos and Santorin, produce excellent wine fruits. Santorin is a ruined volcano, the at crater of which has been invaded by sea, and in the centre of it repeated ptions, the latest in 1866, have formed eral new small volcanic islands. Little a, in the centre of the Cyclades, contains town of *Syra*, also called *Hermoupolis*, ich has risen during the nineteenth cen- y into the most important trading centre the whole Ægean; but it is now de- ning. Several small islands on the east st of the Peleponnesus, Hydra, Spetsae and Paros are inhabited by anians and carry on considerable shipping trade.

FIG. 180.—*Santorin.* (*Sea less than 100 fathoms is shown white.*)

STATISTICS.

	1889.		1896.
Area of Greece (square miles)	25,152	..	25,152
Population of Greece	2,187,208	..	2,433,806
Density of population (per square mile)	87	..	96
Population of Athens	107,251	..	111,486
,, (with Piræus and suburbs)	148,924	..	179,755
,, Piræus	34,327	..	43,001
,, Patras	33,529	..	37,985
,, Trikkala	14,820	..	21,149
,, Syra	22,104	..	18,760
,, Corfu	19,025	..	18,581
,, Volo	11,029	..	16,788

ANNUAL TRADE OF GREECE (*in dollars*).

	1871–75.		1879–83.		1891–95.
Imports	20,000,000	..	24,500,000	..	22,500,000
Exports	15,500,000	..	13,500,000	..	17,000,000

VIII.—CRETE

Crete.—The Island of Crete (modern Greek *Kriti*, Italian *Candia*) f
part of the great curve of islands which bounds the Ægean Sea on the s
Three mountain masses, principally composed of limestone, occupy
island ; the chief being Mount Ida, 8,070 feet high. The mountain
steeply on the south to a harbourless coast, in the middle of which
only low ground occurs as the plain of Mesara. To the north they

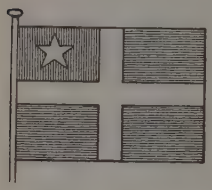


FIG. 181.—*The Cretan Flag of 1898.*

more gently, forming a hilly region of
siderable fertility and ending in a richly
dented coast. The climate is warm and
rainfall sufficient. Extensive herds are past
on the mountains, and the plains yield g
oil, wine and fruit plentifully. Crete has
quired particular importance on account o
position at the exit of the Ægean Sea, w
made it in ancient times a great sea po
with numerous thriving towns. In the Mi
Ages it was for some time in the possession of the Arabs ; it decl
gradually in importance under the Venetians, and its ruin was c
pleted by the dominion of the Turks from 1669 to 1898. The island
now received autonomous government, guaranteed by the Great Pow
but it remains under Turkish suzerainty. A part of the population ha
become perverted to Mohammedanism, bitter religious feuds have le
continuous strife and bloodshed, in which the brave mountain tribe
the Sphakiotes took a conspicuous part. In spite of religious differe
almost all the people belong to the same Greek stock,
even the Mohammedans speaking no language but
Greek. Before the revolution of 1896 about one-
quarter of the population were Mohammedans, but
now most of them have left the island. The people
live almost exclusively by agriculture and cattle-
breeding ; the principal products being wine, olive
oil and carobs. The three towns of the island all lie
on the north coast, and possess indifferent harbours ;
Khania (*Canea*) in the west, *Rethymnon* further east,
and the largest town, *Iraklion* (*Megalokastrom* or *Candia*), about
middle of the coast-line. Suda Bay, with the best anchorage for shipp
lies a little to the east of Canea.

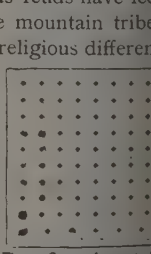


FIG. 182.—*Average d
ulation of a squ
mile of Crete.*

STATISTICS.

	1900.
Area of Crete in square miles	3,324
Population of Crete (estimated)	303,543
Density of population per square mile	91
Population of Candia	22,331
" Canea	21,025
" Rhetymnon..	9,311

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CHAPTER XX.—ITALY AND MALTA

I.—ITALY

By Dr. Theobald Fischer,[1]
Professor of Geography in the University of Marburg.

Position and Geological History.—The Italian Peninsula, ce
amongst the peninsulas of southern Europe, owes its origin and confi
tion to the circumstance that a branch of the great Eurasian Earth-fol
the eastern edge of the old Tyrrhenian crust-block diverges in a soutl
direction across the Mediterranean belt of subsidence, and only resume

Fig. 183.—*Tectonic Map of Italy.*

east and west dire
of the Eurasian fol
the south in the pr
Sicily. This acc
for the configuratic
Italy and its e
through 11° of lat
from 47° to 36° N.
long, narrow land b
across the Mediterra
Sea. The Appen
are perhaps the
recently formed m
tains in Europe.
plain of Lombardy i
north took its rise
the elevation in Qu
nary times of a deep
of the Adriatic Sea
tween the Alps
Appennines, comb
with the accumul
of the sediment bro
down from both ra
by glaciers and ri
The Quaternary
also brought together the severed portions of an older pre-Mi
Appennine range which had not been incorporated by the last fo
movement; thus Gargano and the Apulian Cretaceous plateau in the s
west were united with the Appennines. A portion of the Appennine

[1] Translated from the German by the Editor

rated in the Pliocene epoch by a rift, being cut off at the same time by
ilar dislocation from the continuation of the Appennines in Tunisia,
s the present island of Sicily. The Malta group, Lampedusa, and the
dian Islands at the west end of Sicily are all that remain of the great
iary plateau which once united Sicily with Tunisia. Only fragments are
of the ancient mass of Tyrrhenia which lay to the west of the present
ennine lands, and in the course of the Tertiary and Quaternary periods
rise by direct subsidence to the vast depression now occupied by the
henian Sea. Some of these relics were attached to the Appennine lands
ne latest crustal movements and form the plateau of Tuscany, Calabria
the north-east of Sicily, while the twin islands Sardinia and Corsica
esent a portion left standing in the middle of the depression.

Natural Divisions and Coasts.—Italy consists of three parts: *Continental*—including the slopes of the Alps and Appennines towards northern plain—the *Peninsular*, and the *Insular*. The two latter more than two-thirds of the whole, and even in continental Italy distance from the coast is so small that 80 per cent. of the whole try is within 62 miles of the sea; Turin is 65 miles and Milan 75 miles from the coast. Italy is separated from central Europe by great wall of the Alps, and it is as a whole a maritime Mediterranean try. The detailed structure of the coast emphasises this character s remarkable richness in natural harbours, particularly on the west, e the bays of Genoa, Spezia, Talamone, Gaeta, Naples, Salerno, castro, Santa Eufemia, Palermo, and Castellamare succeed one ier. The numerous islands off the coast include Elba, a remnant ie ancient Tyrrhenia, and the volcanic groups of Ponza, Ischia, the Lipari Islands, which beautify the surface of a sea rich in ies and precious coral. While the land frontier of Italy measures 1,200 miles, the coast stretches for more than 4,000. Except on hallow shores at the head of the Adriatic, the coast is everywhere accessible from the interior, and is as a rule bold and rocky with resque promontories furnishing magnificent landmarks and offering ites for lighthouses visible far to seaward. On the west coast only the ern part from Spezia to the Gulf of Gaeta is flat and swampy, making ial harbours necessary at Civita Vecchia and Leghorn. The population ly is generally dense along the coast, and more than 16 per cent. of esent population live within three miles of the sea.

alue of the Position and Resources of Italy.—Italy, as a , looks towards the west, and in a sense towards the east also, gh, so to speak, the peninsula turns its back upon the Adriatic, is only 110 miles wide on the average, and at the Strait of to less than fifty. The country is singularly well placed for unication with the eastern Mediterranean and the Suez Canal count of its fine eastward-facing harbours of Venice, Brindisi to, Messina, and Syracuse. From Sicily and Sardinia com-

munication with the north coast of Africa is easy, the distance f
Sicily being less than 100 miles. With continental Europe there is
communication by the Alpine roads which converge on Turin, Milan,
Venice. These many-sided relations make the geographical positio
Italy exceptionally favourable for commerce, and on this account it bec
the focus of the trade and civilisation of the narrow world of antiquity
the Middle Ages. It is to-day the very heart of the Mediterranean l
and plays a great part as a link in the chain of communication betw
north-western Europe and the Far East. Italy may become one of
real Great Powers only if it succeeds in commanding the Mediterra
by its naval forces. The Italian people are directed to the sea as t
field of enterprise the more distinctly because three-quarters of the sur
of the land is built up of geological formations not older than the Ter
period, and consequently there is little mineral wealth. No coal is fo
and the sulphur deposits which occur mainly in Sicily are the
valuable mineral resources; they supplied till a short time ago
of the sulphur used throughout the world. The marble quarrie
Massa, Carrara, and Serravezza are of great value. Iron-minin
only important in the relics of the ancient Tyrrhenia in Elba
Sardinia. The industrial value of the country is due to the produc
of a few important raw materials—silk, flax, hemp, and straw—to
economy of sea-transport, the cheapness of labour in a country wit
rich a soil and so genial a climate, and at the present day to the uti
tion through electricity of the important water power made avail
in the Alps and Appennines.

Configuration of the Alps.—Since Italy is mainly composed of
Appennine range with which the inner slopes of the Alps unite, it is or
whole a mountainous land. Only one-third of the surface is made u
plains, most of this being the great Plain of Lombardy. The Italian
(Fig. 51), usually named after the provinces of the neighbouring p
e.g., the Alps of Piedmont, Lombardy, and Venetia, tower into lofty sum
and abound in snow-fields and glaciers. Mont Blanc and Monte Rosa
on the boundary line. The Alpine chain is trenched by numerous transv
valleys running parallel to one another, formed by the erosion of th
and its tributaries the Dora Baltea, Sesia, Ticino, Adda, and further
the Adige and Tagliamento, by which roads are carried through the bor
ing mountains up to the important passes across the Alps—the Mt. C
Simplon, St. Gothard, Splügen, Maloja and Brenner. Where the val
meet the plains they are often occupied by long, narrow lakes along w
the Alpine roads run through scenes of famous beauty. The upper Ita
lakes, especially Lago Maggiore, Lago di Como and Lago di Garda are
only important as pleasure resorts but they form the great reservoirs
the rivers of the plain.

Configuration of the Plain.—The Plain of Lombardy is a l
narrow trough formed by subsidence between the Alps and Appenni

ch inclines eastward towards the Adriatic as well as inwards towards central line along which the river Po flows. In the middle of the n beautiful groups of small hills arise, especially the Monti Berici near nza and the Colli Euganei near Padua, both of which are remains of old anic activity, on the inner side of the great crack between the Alps and plain. The Montferrato hills between Turin and Alessandria in which La erga rises to 2,140 feet, commanding a splendid view across the plain, prographically separated from the Appennines by the broad valley of the aro, which occupies a synclinal fold of the Appennine system. These give a special character to the Piedmont portion of the plain. A hilly on, for the most part made up of old moraine amphitheatres set with l lakes and moors, the peat of which is already in most cases exhausted, close along the base of the Alps, the perfect form of the plain first earing at some distance further out. The many rapidly flowing s, the rich cultivation and, in a special degree, the wealth of forests ther with the many towns and villages and the views of the encircling ntains free this part he plain from any arance of monotony. he rivers flow towards central line running west to east formed st by the Dora Riparia from Turin onwards e Po, which, from its ne of water and the of its flow, has drawn lower courses in an

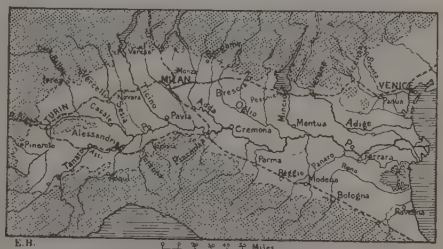


FIG. 184.—*The Plain of Lombardy.*

ly direction as is shown in the Ticino, Adda, Oglio, and Mincio, while dige has been completely turned aside and pursues an independent e eastward across the deltaic plain. Although as true torrential rivers reams of the Plain of Lombardy do not attract population to their , their valleys have played an important part as strategic lines in time r.

onfiguration of the Appennines.—The Appennines present a xample of a folded mountain chain broken off abruptly on one y the sunken area of the Tyrrhenian depression. The parallelism of ccessive chains is clearly shown in the northern and central Appen- by their arrangement *en echelon* so that the general south-easterly of the chains, like the wings of a theatre, pushes a more easterly a more westerly which gradually falls off in height and is finally at the Tyrrhenian trough. Each chain thus forms a portion watershed until that function is taken over by a more easterly. way—and not as a simple chain—the mountain wall, which serves s a dividing line of climates, is formed between Genoa and

Ancona, and about the 44th parallel separates Northern and C
Italy.

The *Northern Appennines* are usually separated into the Liguria
Etruscan from the Col di Cadibona (1,600 feet high) which separate
Ligurian Appennines from the Alps, to the Bocca Serriola (2,400
They have a small elevation both for crest and peaks, the highest s
being Monte Cimone (7,110 feet) which is crowned by a meteorol
observatory. The northern section of the range is formed through
Tertiary strata, mainly clay, which, in spite of the moderate elevation
passes (rarely above 3,000 feet) makes the construction and mainte
of roads very difficult. This is true, indeed, for the whole range
Appennines as far as Sicily. Throughout the whole range also, the
or eastern side is cut into blocks by the valleys of parallel st
which flow at right angles to the direction of the chain, *e.g.*, the Tr
Panars, and Reno, while on the inner or western side the
have been developed in the longitudinal valleys of the mountain
where they form a few large drainage systems and are much longer
those of the other slope. The chief western rivers are the Magra, Se
Arno, Tiber, Garigliano, Volturno, and Sele.

The *Central Appennines* may be divided into those of Umbria a
Marches in the north, and those of the Abruzzi in the south. Th
very clearly distinguished from the Northern Appennines by the ab
of the numerous intrusions of serpentine which distinguish the fo
and by the increasing prevalence of limestones, principally Creta
which give rise to steep bald slopes and wildly rugged crests and
These have suggested the erroneous idea that the Appennines are a
stone range, whereas they really are mainly argillaceous. From
Nerone to the Matese mountains the country exhibits the karst phen
of lakes, caverns, and powerful springs which give rise to permanent
There are signs also of great vertical displacements or faults
here play an important part in mountain building. These disloc
are associated with the increased frequency and force of the
quakes experienced towards the south. The Central Appennines c
some high summits, chief amongst which is the Gran Sasso d'Italia
feet, and there are many peaks exceeding 8,000 feet. On the Tyrrh
side the development of numerous folds of gentle curvature in the
chain forms extensive highlands such as those of Umbria and Abruzz
sharply defined longitudinal valleys in which the rivers flow, and dep
intermont basins.

The *Southern Appennines*, beginning at the Vinchiaturo Pass (1,800
may be divided into a Neapolitan and a Calabrian portion. The Neap
Appennines are characterised by the outcrop of older Triassic lime
along the whole Tyrrhenian side and by plateaux made up of fla
recent Tertiary strata, particularly on the eastern side. Traffic acro
range is impeded not so much by the height of the passes (th

rtant railways from Campania to the Apulian plain at Foggia and to Gulf of Taranto hardly reach an elevation of 2,000 feet) as by the owness of the defiles which in former times played their part in ary history, and later opposed great difficulties to the construction of ays. Monte Polino, with an elevation of 7,450 feet, rises in rugged tone peaks above the valley of the Crati, which separates it abruptly the gentler forms of the Archæan rocks of Sila in Calabria. The age of the Southern Appennines runs in regular parallel valleys of on eastward to the Adriatic, the Biferno Fortore and Ofanto, or south- to the Gulf of Taranto, the Bradano Basento, Agri, and Sinni. The orian Appennines are mainly composed of fragments of the ancient henian crust-block, with remains of ancient sedimentary strata on the rn side which formed a group of islands in Pliocene times and were united by a Quaternary uplift as a narrow land bridge rising from a depth between the Tyrrhenian depression on one side and the yet er Ionian deep on the other. The flanking Tertiary zone of the nnines is in this part submerged in the Ionian depression and only pears in Sicily where it forms the broad southern slope of the d. The Calabrian range consists practically of the masses of the mountains and of the Aspromonte. No point of it quite reaches feet; its rounded, massive forms are explained by the gneisses, alline schists and granite of which it is composed. A usually w zone of the most recent formations borders the ancient rock es; it is built up principally of the deltaic fans of the torrents and s a coast line without shelter, so that Calabria remains a closed land to lay.

he Appennine Foreland.—A broad, low foreland formed by the merged border of the Tyrrhenian depression and gulfs filled up by and volcanic sediments lies along the Appennine region from ulf of Spezia to that of Policastro. The line of fracture separating wo is distinct both orographically and hydrographically: all the follow the longitudinal valley to which it gave rise, after leaving ppennine region, and it is also one of the most important lines of unication in Italy, along which a railway runs from Pistoja and ace to the Vallo di Diano which separates the mountains of Cilento the Appennines. The broad belt of land cut off by this valley is composed of surviving fragments of Tyrrhenia, such as the highlands scany, partly of sunk portions of the Appennines, like the Lepini and o mountains, and partly of small volcanic cones and craters contain- ses, such as the Albanian mountains and the Phlegræan fields with ius (Figs. 191 and 192), and finally of elevated portions of the sea-bed d with volcanic ejecta, such as the plains of Rome and Cam- or river sediments of the Arno, Tiber, &c. As the Tyrrhenian nine foreland was first brought into contact with the Appennine in the Quaternary period so also was the much lower foreland

on the Adriatic side. At the beginning of that period a strait ra the Gulf of Taranto through the Plain of Foggia to the Adriatic an where a transverse fault crossed the great longitudinal crack, th of Monte Volturno (4,265 feet) was upheaved. From the depression, is still easily recognisable, rise the heights of Monte Gargano a chalk tableland of Apulia (Le Murgie) a poorly watered ka rendered very fertile in parts by a covering of loess.

The Italian Islands.—Of the many straits which divided th of Italy into islands in Pliocene times only one, the Strait of Messi resisted the great Quaternary upheavals whose action produc wonderful terraced scenery of Calabria. The Strait of Messi produced by an exceptionally deep-seated fracture, which accou the severe earthquakes still experienced in Messina and Calabria crossing of this fracture by the fault which gave rise to the steep south- scarp of Calabria is marked by the upheaval of the greatest of the M ranean volcanoes—the giant mass of Etna, which towers to the he 10,740 feet. The triangular island of *Sicily* resembles the Appennine in having its steepest slope to the Tyrrhenian depression out of whi the volcanic Lipari Islands. This steep northern side is compos southern Italy of Triassic formations, while on the outer side towards soft Tertiary rocks, rich in sulphur, form a gently sloping tableland mean height of 1,450 feet which has been cut into a chaos of round by river-erosion and denudation. Except Etna, no mountain in attains 6,500 feet, and the highest summits all lie in the well-w district near the north coast, the scenery of which is remarkably vari picturesque. Its agricultural resources make this the most densely p part of the island, and in the strip of land from the sea-shore to the of 160 feet the density of population reaches 2,530 per square mile.

Only the Peloritanian mountains in the extreme north-east of Sicily viewed as a relic of the ancient Tyrrhenia, but the whole of *Sardin* portion of that vanished land. Sardinia is mainly composed of a crystalline rocks, especially granite ; but in the south there are Pal strata rich in copper and silver-lead ores, and on the west side eruptive rocks appear. The island is almost all occupied by mou covered with wasted forests and undergrowths, and with a raw c although no point reaches the height of 6,000 feet. The small plai swampy and malarial, and of the little islands only Caprera, the dw place of Garibaldi, need be mentioned. La Maddalena, now uni Caprera by a bridge, has been converted into a naval station comma the Strait of Bonifacio.

Climate.—Its climate makes Italy one of the most favoured la the Earth, and the garden of Europe. The great wall of the Alps p it from the northerly winter winds and from continental influences. Appennines from Nice to Ancona form a second line of climatic defen the whole land is open to the south and to the equalising influence

terranean, a sea filled to its greatest depth with water over 50° F. in temure. The winters are mild everywhere, even in the Plain of Lombardy, outh of the Appennines the temperature seldom falls to the freezing , and never goes far below it, while ry in Sicily is like May in England. of the 40th parallel the prevailing in summer is northerly, and tends to rate the heat. The protection of the tains forms veritable climatic oases to the foot of the Alps, on the Ligurian and at Amalfi and Salerno. Yet even ily a little snow is no very rare occur-. On account of the position of the tic high pressure area to the north of in summer and to the south in winter, talian summer is deficient in rain, and is an accumulation of rainfall in winter, but towards the north the ier rainfall is not so deficient, and in some places at the foot of the Alps is not much difference in the amount of precipitation in spring, summer, tumn. In Sicily and Sardinia from 35 to 40 per cent. of the annual ll comes in the winter months. Hence the rivers, except those fed by owerful springs of the limestone regions, are remarkably variable in ne. Floods and inundations occur in the rainy period with very high during autumn, especially in the rivers flowing from the Alps, but in entre and south of Italy the rivers are little more than dry stony beds during summer, and artificial irrigation is rendered necessary. The distribution of rainfall is determined by the configuration of the land. It is greater on the Tyrrhenian than on the Adriatic slope; greater on the southern margin of the Alps than on that of the Appennines, but greatest on the slopes of the mountains near Genoa, where it is 51 inches, and at Tolmezzo in Friaul, where it reaches 100 inches. The rainfall of northern Italy may be stated as about 40 inches on the average, that of central Italy about 32 inches, and of southern Italy not much more than 27.

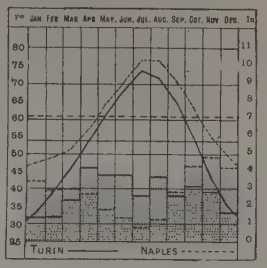
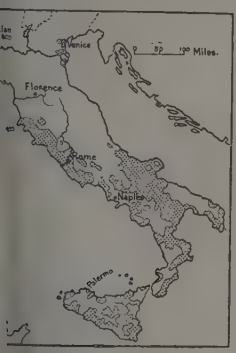


FIG. 185.—*Rainfall and Temperature of Turin and Naples.*



186. *The Malarial Districts of Italy, shown in stipple.*

Malaria, which is characteristic of all editerranean lands, is particularly common in Italy, and is the st drawback to a land otherwise so favoured. Only six of the vinces—Porto Maurizio, Genoa, Messa-Carrara, Florence, Pesaro, acenza—are entirely free from malaria. It makes large areas un-

inhabitable and uncultivable in spite of the fertility of the soil, whic
only be utilised for winter pastures, and it hampers the railway se
One-sixth of the population of Italy suffers from malaria, which c
14,000 deaths per annum.

Flora and Fauna.—The flora of Italy is that typical of the Me
ranean region, at least so far as regards the centre and south, and al
broad belt of the west coast south of Liguria. It includes evergreen
of kinds fitted to withstand the long drought; and the olive may be l
upon as the most characteristic growth. The olive is excluded fro
Plain of Lombardy by the comparatively severe winter; but it ap
along the immediate foot of the Alps, especially round the borders
lakes, and it surrounds the whole coast of Italy, growing in Ligu
altitudes of nearly 2,000 feet, and in Sicily to 3,000 feet. The fl
central Europe prevails in the Plain of Lombardy, and in the moun
in Sicily there are forests of chestnut trees between 2,000 and 3,00
and of beech from 3,000 to 5,500 feet. The Mediterranean belt is ch
terised by the evergreen oak and pine, the Aleppo-pine, cypress
especially a number of low evergreen and often thorny aromatic shru

The fauna of Italy is poor, and has little of geographical interest.
reptiles (lizards), however, are almost too abundant, and so ar
snails.

People.—The favoured land of Italy has been the goal of
migrating peoples both from the north and south, yet they all ad
one language, and at present unity of speech prevails in Italy
extent unapproached in any other country of Europe. The peo
ethnically remarkably mixed, and the contrast between the northern
southern Italians is very great. The mixture of races may be traced
to the great Roman trade in slaves, by which Phœnicians, Greeks, Be
and Arabs from the south were brought into contact with Kelts, Ger
and Slavs from the north. Five ethnical groups are now believed to
inhabited prehistoric Italy. These were the *Iberians* in Sardinia, the
rians in Liguria, the *Italians* in the greater part of central and southern
the *Illyrians*, in Venetia and Apulia, and the *Etruscans*, amongst whom
Kelts intruded themselves, in the Plain of Lombardy. All of these ad
the Latin language in the Roman period, but to this day traces
primitive physical types may be recognised in the local dialects of I
In the south, especially in Sardinia and Calabria, the physical ty
narrow-skulled (dolichocephalic), of short stature, with dark complexi
hair, while in the north the type is on the whole broad-skulled (br
cephalic), tall, fair, and light-haired. Of the dialects of Italian, Tus
considered the purest form of the language. In the valleys of the we
Alps about 120,000 people still speak French, and in the east half a m
Friaulians preserve their Rhæto-romanic tongue. A few German s
ments in the Alpine valleys and some Slavs in Friaul and Abruzz
almost all bilingual. There are also a few Albanians in Calabria and S

Greeks in Apulia, and about 40,000 Jews, mainly in northern Italy Leghorn. Reckoning the Friaulians as Italians, there is a foreign tion of only 1 per cent. on Italian soil, while about 5 per cent. of the people live abroad, about one million in North and South America, e others mainly in Switzerland, Austria, Corsica, and Malta.

story and Government.—The historical subdivision of Italy in the sharpest contrast to the physical unity and isolation of the The Romans united Italy first politically and then linguistically; litting up commenced with the fall of the Empire, and led to the shment of foreign rule over larger or smaller areas by the Germans, rds, French, and Austrians. Yet in spite of this the linguistic and ctual individuality of Italy was never lost, and in the Middle Ages influence on the rest of the world, on t of the power of the Pope in the Roman ic Church, was hardly less than in Roman In maritime trade the Republics of Amalfi sa, and still more those of Venice and Genoa, ated the world until the sixteenth century, ey also centralised a large share of the land- of Europe. In recent times Italy was united ne war of 1860, when six of the independent combined to form the kingdom of Italy as a constitutional monarchy. ; Lombardy was added, and Venetia in 1866, both being reconquered ne Austrians, while in 1870 the last remnant of the Papal States was orated and Rome became the capital. The kingdom of Sardinia e nucleus around which the united nation crystallised. The new m was subject at first to great dangers and difficulties, not least ue to the fact that the citizens had not been trained to freedom and vernment, while a heavy national debt has involved excessive taxa- der which the country still suffers.

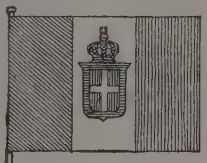


FIG. 187.—*The Italian Naval Ensign.*

nomic Geography.—Italy is destined by nature to be an ural country. The climate allows of all the crops of Europe and f those of the tropics being grown, while in Sicily, by artificial n, seed-time and harvest may occur at all seasons of the year. In npagna the irrigated meadows may yield as many as ten crops in r, and in Lombardy from four to six. In almost all parts of the two or three harvests can be reaped in one year from the same rtificial watering is very important in the north where the object is ase the yield of the crops and to allow rice to be grown in the f Lombardy, and in the south to allow of the growth of oranges ons. The irrigated area is nearly 8,000 square miles, and it can greatly increased. The yield is enhanced two or three-fold on the and as much as twenty-fold in Sicily, on account of the growth of and lemons. The cultivation of southern fruit trees, especially of e, to which alone 3,500 square miles are devoted, gives to whole

countrysides the appearance of well-cultivated gardens. Terrace cu
tion also is a characteristic of Italian agriculture. Wheat of excep
quality is raised in Sicily, rice and maize are more grown in the r
Vineyards occupy about 8,000 square miles, and Italy is second on
France as a wine-producing country. Yet agriculture no longer stan
its former high level. The system of large estates and the prevalen
malaria renders great areas of the most fertile
unproductive. In some provinces only 18 per
of the land is under cultivation, and the av
for the whole country is 37 per cent., while
11 per cent. can be considered as naturally u
ductive. Cattle-breeding is in a still worse pos
Italy is poor in live stock, and it is only i
north, especially in Lombardy, that cattle are
tably kept for butter and cheese. There

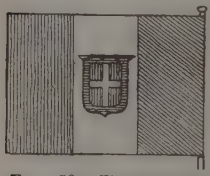


FIG. 188.—*The Merchant Flag of Italy.*

poultry farming and artificial fish-breeding are largely carried on
the centre and south the flocks and herds wander as the season cha
from the mountains to the coastal plain and back again.

Trade and Communications.—In Lombardy, Liguria and
mont, silk spinning and weaving give employment to 200,000 people
there are factories for woollen and cotton weaving and for the prepar
of flax and hemp, as well as other industries.

The trade of Italy is mainly maritime; but the opening of the A
tunnels has developed a considerable land trade as well, bringing
perity to Turin and Milan, and even making Genoa to some extent the
of south-western Germany. The mercantile fleet of Italy has recently
declining in importance, and now comes fifth amongst the nations
Genoa, although mainly an import harbour, attracts much shipping, an
serious rival to Marseilles. Most trade is done with
France, and next with the United Kingdom, Austria-
Hungary and Germany. The exports are chiefly
agricultural products, the imports grain and textiles.
The improvement of trade has been fostered since
1860 by the construction of harbours, railways, and
roads on a scale attempted in few other countries—
too much, indeed, for the finances of Italy if not yet
enough for its necessities. The railway system
amounts to about 7,500 miles, and there are also 1,200
miles of steam-tramways. For a land in which agri-

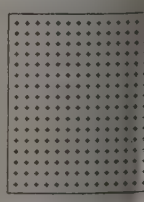


FIG. 189.—*Average lation of a squa of Italy.*

culture predominates, Italy is very densely peopled, even although
extensive districts, such as the neighbourhood of Rome, are entirely
habited, and the number of emigrants is steadily increasing on accou
the poverty of the country.

Towns of Northern Italy.—For administrative purposes Ita
divided into 69 provinces, differing greatly in area and population, and

ndaries showing little relation to physical features. The old division sixteen regions is better for geographical purposes. Five of these sions—Piedmont, Lombardy, Venetia, Emilia, and Liguria—belong to hern Italy. They are the most important from an economic point of and contain 45 per cent. of the popu-

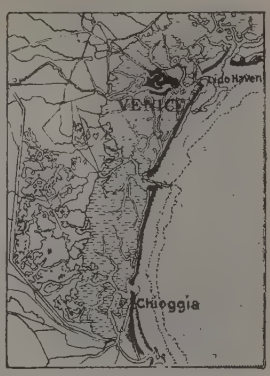


FIG. 190.—*The Site of Venice.*

on. The principal towns have, as a rule, vn up on the edge of the plain along borders of the Alps and Appennines . 184). There is a town at the outlet of y mountain valley; the larger the valley the more important as an entrance to mountains or a passage through them, more important is the town, and the ter the part it has played historically. those, however, on which the Alpine Appennine roads converge have become y great cities; such for instance is *gna*, and, in a still higher degree, *Turin Milan*. These also lie on the most ortant east-and-west line of communi-on, and are centres of a fertile and diligently cultivated neighbour-t in which manufacturing industries are well developed. Amongst historically important towns of the plain are *Pavia* at the mouth of Ticino, *Piacenza* and *Cremona* at points where the Po could easily idged, *Mantua*, a fortress in the midst of a defensive system of lakes; *ia*, an ancient seat of learning, and *Ferrara*, which dominated the trade on the waterways of the Po delta; but their old greatness has waned *Venice* (*Venezia*), a lagoon port unassailable alike by land or sea, which succeeded to the importance of Ravenna when the sea approaches to that town were silted up, now preserves only the shadow of the splendour it attained in the Middle Ages. *Genoa* (*Genova*), on the other hand, on

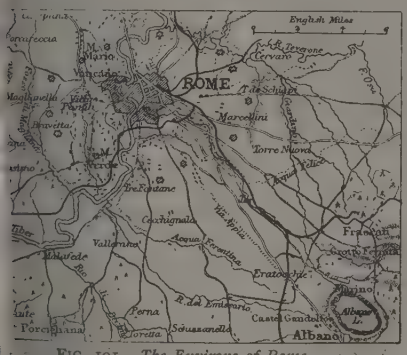


FIG. 191.—*The Environs of Rome.*

nt of the trade through the Alpine tunnels and because it is the true of the whole of Liguria, has grown in importance and secures still r advances by continuous improvements of the harbour. *Spezia*, on order of Central Italy, is a purely naval port.

Towns of Central Italy.—This division includes the regions Tuscany, the Marches, Umbria, Rome, Abruzzi, and Molise, and conta 21 per cent. of the population. The coasts are unfavourable, and the o seaport requiring mention is the artificial harbour of *Leghorn* (*Livorno*) taki the place of *Pisa* which was silted up long ago. The centres of popul th are dependent on the north-and-south lines of communication, *e.g.*, *Sie Perugia*, *Florence* (*Firenze*), and even Rome itself, each of which is connec with the passes of the Appennines and is also the chief town of a rich ag cultural neighbourhood. *Rome* (*Roma*), founded on a group of tufa hill a crossing-place of the Tiber, and the mouth of the Anio, indeed in so respects commanding the mouth of the Tiber itself, occupies a remarka favourable position for the Tyrrhenian coast (Fig. 191). At the same ti the convenient route across the Appennines to *Ancona* on the Adriatic a thence by *Rimini* to northern Italy makes it almost the geometrical cen

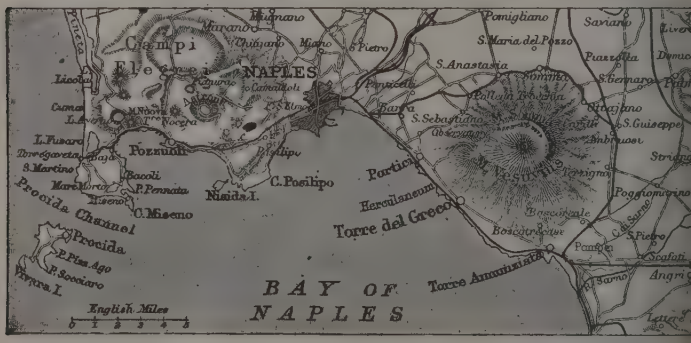


FIG. 192.—*The Environs of Naples.*

of the peninsula. On this account it has become the capital of united Ita and so entered upon a third period of prosperity, the former epochs ma ing the climax of the greatness of the ancient and the mediæval world. city approaches it in the number and interest of its historical associatio The ruins of the ancient Forum and Colosseum are grand relics of anci Rome, while the Cathedral of St. Peter's is the most famous church the world. The King of Italy resides in the Quirinal; the Pope lives seclusion in his palace of the Vatican.

Towns of Southern Italy.—The regions of Campania, Apulia, Basilicata, Calabria, Sicily, and Sardinia form Southern Italy with 34 cent. of the population of the country. All the important towns of th division are situated on the coast. The comparatively easy conditions life in the fertile Campania have caused *Naples* (*Napoli*) to grow into t largest city of Italy. Its surroundings are of rare beauty, and the clima is typical of the south at its best, while the neighbouring town of *Pozzu*

ıds in the midst of vast ruins of the Roman period. The ancient nan watering-places of Herculaneum and Pompeii at the base of Mt. uvius, destroyed and buried by the great eruption of A.D. 79, have been a large extent excavated, and the old streets and houses have become e more a centre of attraction for pleasure-seekers. *Amalfi* and *Salerno* e shrunk to shadows of what they were, but the fine natural harbours of *ndisi* and *Tarento* have given a new lease of prosperity to these towns, they rank next to *Bari*, the largest of the coast towns of Apulia.

Palermo, the capital of Sicily, stands on a grandly sheltered bay of the th coast, facing Italy, in the middle of a vast forest of fruit trees. On eastern side turned towards Greece, *Syracuse*, once the chief town of Greek world, has fallen into decay, and is surpassed in importance by *ania* at the foot of Mount Etna on the shore of the Strait of Messina. centuries during the Middle Ages and even in antiquity, Sicily main-ed the closest relations with Africa, and *Girgenti* on the south coast was a flourishing town.

In Sardinia the chief towns, *Cagliari* on the south and *Sassari* in the th, have never had more than local importance.

STATISTICS.

	1881. (*Census.*)	1901. (*Census.*)
Area of Italy in square miles	110,684	110,684
Population	28,459,628	32,449,754
Density of Population per square mile	257	293

POPULATION OF LARGE TOWNS.

	1881.	1901.		1881.	1901.
es (Napoli)	463,000	564,000	Catania	96,000	150,000
e (Roma)	273,000	463,000	Leghorn (Livorno)	79,000	98 500
ı (Milano)	296,000	491,000	Ferrara	28,800	87,700
ı (Torino)	230,000	336,000	Padua	47,300	82,300
mo	206,000	310,000	Lucca	20,400	74.700
a (Genova)	138,000	235,000	Alessandria	30,700	71.300
nce (Firenze)	135,000	205,000	Bari	58,200	79,700
e (Venezia)	129,000	152,000	Verona	60,700	74,200
gna	104,000	152 000	Brescia	43,300	70,600

ANNUAL TRADE (*in pounds sterling*).

	1871–75.	1881–85.	1890–94.
Imports	52,600,000	59,400,000	52,000,000
Exports	48,200,000	49,800,000	42,500,000

STANDARD BOOKS.

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II.—SAN MARINO

The Republic of San Marino.[1]—The city of *San Marino*, picturesquely massed on a rocky height about ten miles south-west of Rimini, is centre of the most ancient and the smallest republic in the world.

[1] By the Editor.

This little State, with an area of only 23 square miles and a population 8,000, is entirely surrounded by Italian territory, but remains quite in pendent of Italian jurisdiction. The supreme authority is vested i Senate of sixty members elected for life. The foreign relations of S Marino are necessarily with Italy alone, and a treaty of friendship w that Power is the only international agreement necessary.

III.—MALTA

By Lieut.-Col. Sir R. Lambert Playfair.

Position and Resources.—The Maltese group consists of t principal islands, Malta and Gozo, separated from each other by a chan three miles broad, in which are the islets of Comino and Cominetto, wh off the south-west coast is the small rock called Filfila. Malta is situa in lat. 36° N., and long. 14½° E. on the bank which connects Sicily w the African continent, and which here divides the Mediterranean into eastern and a western basin. distance from Sicily is sixty mil and from Cape Bon in Africa ab two hundred. These islands the insignificant remnants of la now submerged, which must at time have been covered with extensive flora, the home of gigan mammals and reptiles, the rema of which have been preserved the fissures and caves of Malta.

Fig. 193.—*Valetta and the Harbour.*

Although they are mere ro cropping out of the ocean (Ma only contains 95 square mile they are happily covered with thin, rich mould, which enables larger number of people to live on them than on any other equal numb of square miles on the surface of the globe. The great enemy to vege tion is the violence of the wind, which necessitates the gardens being ma small and surrounded with high walls, so that from a distance the pla looks like huge stone quarries. Yet enormous crops are raised, and fruit all kinds and of excellent quality is grown in abundance. The flora great resembles that of Sicily. The flowers have long been celebrated, and springtime give an appearance of great beauty to some of the valley others, however, are bare and rocky, and yield little beyond a few caro trees and prickly pears. The indigenous mammalia belong to well-know European species; migratory birds visit the island on their passage acro the Mediterranean, but only seven species remain there throughout the ye

ongst the reptiles are several snakes, but all harmless; St. Paul is said ave banished the venomous ones, as St. Patrick did in Ireland.

History.—Malta, from its commanding position, midway between raltar and Egypt, and its magnificent harbour, has always been a ition of the greatest importance, and at present is one of the strongest tified positions of the British Empire. The most interesting part of its tory is comprised in the 268 years during which it was subject to the ights of St. John, or Hospitallers, as they were called. After their ulsion from Rhodes, Malta and its dependencies were made over in petual sovereignty to the Order by Charles V., and the knights arrived e in 1530, under their Grand Master, L'Isle Adam. The Turks made eated vain attempts to expel them; their greatest and final effort being 565, when the siege lasted about four months. The final disaster which ell the Order was in 1798, when the island was taken by the French ler General Bonaparte, but they soon made themselves so unpopular their unsparing policy of plundering the churches and charitable insti- ons, that an insurrection broke out. A British squadron was sent by lson to blockade the harbour, and the French surrendered from famine September 5, 1800. In 1814 the island was finally transferred to the ited Kingdom by the treaty of Paris.

Government, People and Towns.—The government now con s of the Governor-General, who is also commander- chief of the forces, and an Executive Council con- ing of six official and fourteen elected members— natives of the island. The language of Malta is a rupt form of Arabic, mixed with ancient Phœnician modern Italian words. *Valetta*, the capital on grand harbour of Malta, is full of splendid build- s; the great object of admiration is the Church St. John, remarkable for its historical associations the richness of its decoration; there are many magnificent *auberges* alaces of the Knights, and the whole island is full of fine build- and objects of archæological interest, probably of Phœnician in. St. Paul's Bay, the traditional scene of the apostle's shipwreck, ie site of ruins supposed to have been occupied in his time.

FIG. 194.—*Colonial Badge of Malta.*

STATISTICS

	1900.
Area of Malta and adjacent islands in square miles	117
Population	183,679
Density of population per square mile	1,570
Population of Valetta	65,000 (?)

CHAPTER XXI.—THE IBERIAN PENINSULA

I.—SPAIN

By Dr. Theobald Fischer,[1]
Professor of Geography in the University of Marburg.

The Iberian Peninsula.—The Iberian Peninsula, the south-weste promontory of Europe, is a world in itself, and a world of contradictio Although the sea surrounds seven-eighths of its periphery, it has the features of a continental mass with restricted access to the ocea forming a huge square, or rather pentagon, with an average elevation 2,200 feet, and terminating on its seaward faces in a high, straight a little indented shore. Although situated between the Atlantic and t Mediterranean, and between central Europe (France) and Africa, its rang of east-and-west mountains serve rather to separate than to unite t continents. There are almost no well-marked inlets on the coast, and fe navigable rivers, or off-lying islands ; the inland routes are made diffic by the many mountain passes. The Iberian Peninsula thus provides traffic route between the ocean and the Mediterranean nor between t Mediterranean lands and north-western Europe. In the course of a lo history the relations have been closer with the southern neighbo Marocco than with the northern neighbour France, so that there is so truth in the French proverb—"Africa begins at the Pyrenees." This po tion, together with certain peculiarities developed in the people by their fiv century-long struggle with Islam, have thrown obstacles in the way of re development. Only one of the many clearly characterised natural regio of the peninsula, Portugal, has acquired importance as a maritime Powe and this also alone amongst the ancient kingdoms has remained a independent State. Its territory was marked out for the seat of separa national life by the gorges of the Minho in the north, the Guadiana the south-east, and the deep canyons of the Douro and Tagus cutting off from the rest of the plateau and forming splendid harbours in the estuaries.

Configuration of the Meseta.—The broad geographical features the peninsula are explained by its geological structure. Three-quarters the peninsula is composed of an ancient and much altered block of t Earth's crust which may be termed the *Iberian Meseta ;* on its margins tw younger land masses were upheaved by tangential thrust into lofty borde

[1] Translated from the German by the Editor.

ranges, the Pyrenean-Cantabrian on the north and the Andalusian on south. The Meseta is made up, for the greater part, of a wide tableland flat-lying strata, its mountainous edges on the west and east turned ards the ocean and the Mediterranean contrasting sharply with the tral plateau. The Iberian Meseta is mainly composed of Archæan and æozoic rocks, especially those of Cambrian, Silurian and Devonian nation; their fractured edges looking down on the plain of Andalusia in south and on that of Aragon in the north. Towards the close of the æozoic period these strata had been upheaved into a vast mountain chain ken through by masses of granite, which was later reduced by marine on and long-continued atmospheric erosion to a uniform surface, a eplain, in the south-west. This was in large part covered over with sozoic continental strata, particularly Cretaceous and Tertiary; and in t by lacustrine deposits. The general uniformity of the surface of the e high plains contrasts n the more varied racter of the borders the Meseta. As a ole, the Iberian table- l slopes gently west- d to the ocean. Its nest part is the Iberian rder Range which arates the plateau of tile from the Ebro in and both from the row coastal plain of encia, a district which r an area of about 000 square miles attains

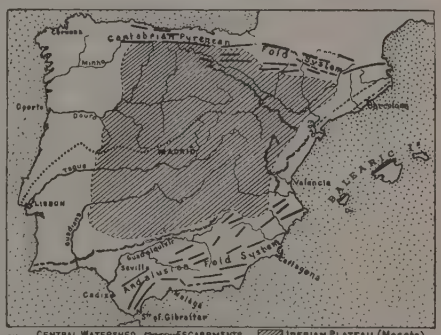


FIG. 195.—*Physical Structure of the Iberian Peninsula.*

average elevation of from 3,500 to 5,000 feet. A greater variety scenery is only found in the Main Dividing Range which has been med by successive fractures and vertical movements, giving rise a series of crust-block mountains which, starting at the mouth of Tagus, follow each other *en echelon* from the south-west towards north-east. These heights separate the basin of the Douro from of the Tagus, the province of Old Castile from that of New Castile. hough in this region there are some lofty summits such as the Plaza lanzor, 8,730 feet, in the *Sierra de Gredos*, and the Pico de Peñalara, 0 feet, in the *Sierra de Guadarrama*, yet these summits only rise ut 5,000 feet above the level of the plateau. The so-called *Sierra ena* is nothing more than the steep southern edge of the Meseta border- the great valley of the Guadalquivir. The parallel *Sierra de Toledo*, ch forms part of the watershed between the Tagus and the Guadiana is enuded highland of small relative elevation composed of a series of

steep saddles of Cambrian and Silurian quartzite closely following
another in a north-west and west-north-west direction, similar in charac
to the German Taunus. While the more recent formations of the plat
yield no minerals, except salt, and form featureless expanses of arable
pasture land, the older strata, especially towards the margins of the pla
are rich in all mineral wealth.

Hydrography of the Meseta.—The drainage of the Meseta
effected along more or less parallel river valleys towards the west:
Minho, Douro, Tagus, and Guadiana, and, most amply supplied of all,
Guadalquivir. This river, however, draws the greatest part of its suppl
from the high mountains of Andalusia, but the fault which gave rise to
Andalusian plain also outlines the steep edge of the plateau. The na
Guadalquivir means Great River, and it has a right to be so called beca
it is the only river of the peninsula navigable to any distance from
sea, vessels being able to ascend it as far as Seville. The other rivers
of less importance, flowing in the deep rocky valleys which their strea
have cut through the plateau, poorly supplied with water, not navigab
difficult to cross, and so far sunk below the general level as to be usel
even for irrigation. At the northern end, the smaller Ebro, which in ma
respects contrasts with the Guadalquivir, flows through a similar val
defined by the boundary fault of the Meseta forming the narrow depressi
of Aragon, which is connected with the Mediterranean only by a tortu
gorge. Its largest tributaries, the Aragon and Segre, bringing in a gr
supply of water from the slopes of the Cantabrian mountains and
Pyrenees render it particularly advantageous for irrigating the lowlar
of Aragon; and the Imperial Canal which has been constructed paral
to it would itself be a most important waterway if the situation were m
favourable.

Configuration of the Fold-Mountains.—The Andalusian pl
and the Ebro basin separate the Meseta from the chains of fold-mounta
in the north and south. Nowhere is there a greater contrast in scene
The Andalusian system of crust-folds consists of a low outer zone of fold
Mesozoic and Tertiary strata, and a lofty inner girdle in which the Archa
and Palæozoic rocks are thrust up so steeply above the Mediterran
depression that Mulahacen, the loftiest summit of the *Sierra Nevada* a
of all Europe outside the Alps, rises to a height of 11,420 feet at a distan
of only 22 miles from the coast. This system of folds begins at
transverse dislocation which separates it from the Atlas mountains and
Pleistocene times gave rise to the Strait of Gibraltar. It extends west
north, and is crossed by a series of transverse valleys at Malaga, Mo
and Guadiz, the tectonic character of which is indicated by the frequen
of earthquake shocks and by the deep bays, now almost silted up, at t
mouths of the rivers. It ends at the Cabo de la Nao; but the line
the Balearic Islands, Ibiza, Mallorca and Menorca (or Ivizo, Majo
and Minorca), and some smaller ones, continues in the same direct

l their structure shows that they are the continuation of the folded ain.

The lofty boundary wall of the *Pyrenees* in the north is also a fine mple of a young folded mountain system built up of parallel belts and ins, their direction being usually west-north-west. On the east they are ken off at Cape Creux, while on the west they are separated from the ntabrian mountains by no definite geological dividing line. The taceous and Eocene belts of the western Pyrenees continue on the nish side as the southern belt of the Cantabrian mountains with the ne character as far as Asturias. But there is a depression in the Creta- us mountains in the Basque Province south of San Sebastian, possibly nected with the formation of the Ebro basin, which gives passage to most important roads from France. In Asturias, the ancient formations the Meseta, including some coal-bearing strata of the Carboniferous, e been much folded and contorted. Rocks of the newer Palæozoic es, together with the Eocene and Miocene folds of the Pyrenees, unite he structure of the Cantabrian mountains, which attain their greatest ght in the Picos de Europa (Torre de Cerredo, 8,670 feet), scarcely 19 es from the sea. The wildness of the scenery on this mountain border, nched with the deep furrows of eroded valleys, may be judged from fact that it was only with difficulty that a piece of level ground could found in Asturias long enough to serve as a base-line, under a mile in gth, for a trigonometrical survey. The loftiest summits of the Pyrenees, ned of the central core of crystalline rock, occur in the Montes Malditos neto, which are 11,168 feet high ; but the peaks of the Tres Sorores nt Perdu), of Cretaceous formation, reach 10,997 feet. Just as the ow and easily defended passes of the Andalusian fold-mountains bled the Moors of Granada to hold their own for centuries against Christians, so the small enclosed mountain valleys of Sobrarbe in the enees, and of Liebana and Valdeon in the Picos de Europa, formed the refuges of Christians during the Mohammedan supremacy, and the res from which they reconquered the land. The Meseta is entirely ting in such natural strongholds.

Climate and Vegetation.—In spite of the length of its coast-line Iberian Peninsula has a climate which may almost be termed conti- al, being characterised by large range of temperature between summer winter, great and rapid variations of temperature, and remarkable dry- resulting from the arrangement of border mountains and plateau. In orth and north-west, from the border of Portugal to the boundary river ssoa, there is an oceanic climate with mild winters, cool summers, and at every season. The vegetation is that of central Europe, and in places cider is even the national drink. But in the interior the air is where dry ; and in the south-east the province of Murcia is so hot arid that it is the only part of Europe in which the date palm ripens ie oases, for example at Elche. Artificial irrigation is absolutely

necessary for agriculture in that region and all along the whole Mediterranean border, except for the irrigated huertas, the vegetation has a steppe-like character, the predominant cultivation being esparto grass for paper-making. The coast-strip of the Mediterranean between Gibraltar and Almeria, sheltered by the lofty Andalusian chain, possesses the warmest winter climate of Europe. In the small well-watered coastal plains of Malaga and Motril sugar-cane is cultivated on a large scale, and the banana, the Peruvian cherimaja, and other tropical plants grow luxuriantly. The mean temperature of January there is 55° F., and frost and snow are extremely rare; but at Madrid, in the centre of the peninsula, skating can often be indulged in, although in summer the temperature may go up to over 107° F. in the shade. The climate of Madrid is the most extreme in western Europe.

Rainfall is most abundant around the border region in winter: in the interior, spring is usually the season of maximum rain, but in some parts the rainiest season is autumn. As a rule the quantity of total precipitation diminishes from the north-west towards the south-east, but in La Mancha, and other parts of the plateau it is so small that the soil remains charged with soluble salts and in consequence only bears steppe-like vegetation. Yet tremendous and sudden bursts of rain are apt to occur in all parts of the peninsula, giving rise to serious floods. With such climatic conditions it is natural that both plant and animal life should exhibit great contrasts in their nature and in their distributions. Barely half of the country has a predominant Mediterranean flora, characterised by evergreen shrubs. The cold of winter and the excessive dryness of summer make such vegetation impossible in the greater part of the highlands of New Castile. The south-western half of the peninsula, especially Estremadura, is rich in thickets of aromatic evergreen shrubs. The mountains of the northern border, and also those of the Main Dividing Range, bear forests of a central European type.

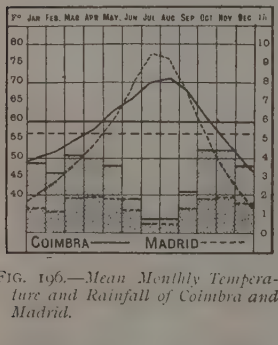


FIG. 196.—*Mean Monthly Temperature and Rainfall of Coimbra and Madrid.*

People and History.—The Iberians appear to have been the oldest inhabitants of the peninsula, and to form the basis of the present Spanish, or rather Castilian, race. Their language still survives, if the dwindling remnant of the Basques, less than half a million of whom live in the mountains of the extreme north-east, may be looked upon as their descendants. Keltic invaders early obtained a footing in the north-west. The Romans civilised almost the whole peninsula, by the establishment of strong military colonies. The immigration of Suevi, Alemanni, and West Goths did not suffice to change the established Roman language and affected the

ysical type of the Spaniards only in a few places, for example in the erra de Bejar, one of the most isolated districts of the Main Dividing ange. The incursion of the Arabs and Berbers (Moors) had a much eper influence on the country, affecting not only the physical type of the ople, but their customs and the geographical names, as is well seen in alencia, Murcia, and Andalusia, where numerous traces of the Moham-edan invasion remain. The Castilian language itself has incorporated any Arabic words. A large fraction of the African immigrants remained the country and were absorbed; the Jews alone were completely and rmanently driven out. The kingdoms of Castile and Aragon, which existed parately for 700 years, and others, were created through the existence of arply defined natural regions; and it was only in the fifteenth century that ese became united, so that only two States now occupy the peninsula. his history explains the contrasts in physical type, customs, and organisa-n between the people of the separate districts, especially between the ndalusians, Castilians, Aragonese, and Catalonians. The few traits which e whole Spanish people have in common, their military spirit and ligious fervour and intolerance, may be traced to the eight centuries of ruggle against Islam. For a century the possession of the rich colonies of merica made Spain the mistress of the world, but the small esteem in which ril occupations were held has led to the loss of all the valuable colonies, and e impoverishment and depopulation of the mother country; the unabated t hollow Spanish pride is now a serious drag to all progress. Besides e predominant Castilian dialect, Catalonian, which is nearer to the French ovençal, is spoken, written and even used in education throughout talonia and the adjacent provinces of Valencia and Aragon. The llegos, near the frontier of Portugal, not only resemble the Portuguese pe in appearance, but speak several old-fashioned dialects which approach sely to Portuguese. The diversity of the provinces plays an important rt in the modern history of Spain, and there is room to doubt whether ain can continue to exist as a single country.

Agriculture.—At least half, perhaps three-quarters, of the people pend directly on the fruits of the soil, which also supply two-thirds of e exports. In the Mediterranean belt of huertas, the rock has to be isted and then powdered with hammers to form soil, the slopes of all the l-sides are terraced, and every available fertilising agent, even the eepings of the streets, is utilised, while artificial irrigation of a highly borate kind is resorted to in order to produce the utmost possible yield. the other hand vast stretches of fertile land on the plateau remain entirely tilled, or else are cultivated in a destructive fashion, without the use of nure or irrigation. The apathy of the people makes all progress possible; the multiplication of large estates, the depopulation of the ntry districts, absence of roads and want of capital are other causes ich have contributed to this result. Almost everywhere, even in the dst of the most flourishing huertas, the tillers of the soil live in the

deepest poverty, a fact which explains the frequency of socialistic and communistic outbreaks. About 40 per cent. of the country is under cultivation, and 9 per cent. is artificially irrigated; but nearly 15 per cent. consists of fertile soil lying waste. In Murcia the productiveness of the ground is increased thirty-seven times by artificial watering. The huertas are mainly devoted to fruit trees such as the orange, date-palm, and pomegranate; but here and there rice, ground-nuts, cotton, sugar-cane, maize, tomatoes, onions and vegetables of every kind are grown. Wheat yields a hundred fold, and lucerne may be cut ten or twelve times in the year. The olive and vine are largely cultivated on unwatered land, mainly on the low grounds. On the highlands of course the nature of the cultivation is more uniform; trees lose their importance, and in many places disappear, the tableland being characteristically treeless; even the mountains have been despoiled of their timber and rise in bald, rocky, and barren slopes. Wheat is an important crop everywhere, the province of Valladolid is called the granary of Castile; yet grain has sometimes to be imported to make up the supply for home consumption. The moist northern border bears groves of the fruit trees common in central Europe; maize and millet are cultivated, and there are green meadows on which cattle are reared for export to England. The great stretches of dry pasture on the tableland, on the contrary, are only useful for sheep farming, an occupation which was formerly much more prosperous than now. The flocks are driven down in winter to the warm and low-lying districts of the south, returning to the highlands in spring. The forests of evergreen oaks in Estremadura make swine-keeping profitable, while Andalusia is famous for the breeding of horses and of bulls for the public bull-fights, a cruel sport confined to Spain and Spanish-speaking countries.

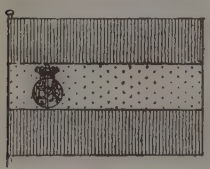


FIG. 197.—*Spanish Naval Ensign.*

Mining.—Spain has been the classic land of mining industry since the time of the Phœnicians. The variety of the mineral wealth in the marginal mountains is astonishing. They yield large quantities of lead and silver, particularly in the south-east from Adra to Cartagena; almost one-quarter of all the copper produced in the world is mined near Huelva on the Rio Tinto; the mercury mines of Almaden have been famous for centuries, and the splendid iron ore of the north coast supports an immense trade. Near Oviedo and elsewhere coal is mined. At present the mines are worked mainly by foreign capital, and in some years the output is worth as much as $30,000,000. During the nineteenth century a certain amount of industrial activity has been developed, chiefly in Catalonia and the Basque Province, where it is favoured by the proximity of mineral wealth, the abundant supply of water-power, and cheap sea transport. The chief industry is the manufacture of iron and machinery; cork-cutting and tobacco manufacture are characteristic, and cotton spinning is important in Catalonia.

Trade.—In spite of its fine position for trade with all parts of the world ain now takes but a small share in international commerce. The internal ade which is stimulated by the different character of the various natural gions is rendered difficult by the configuration; roads and railways have be carried across the marginal mountains by very costly engineering orks, the general traffic centre of the country being Madrid in the centre the tableland. From historical causes such reign commerce as Spain retains is mainly with former colonies, especially Cuba and the Philip-nes, but the shipping in Spanish ports is almost under the British or French flags, the Spanish ercantile marine being very small. Commercially ain depends most largely on France; the rail-ays, for instance, were built by French com-nies, and one-third of the foreign trade is done ith that country, more however by sea than by land. One quarter of the ade is with the United Kingdom. The value of the exports of home oduce, mainly wine and minerals, exceeds that of the imports, which nsist chiefly of cotton, coal, wood, sugar and fish. There are fisheries of me value on the coasts of Galicia and Andalusia; but the frequent fasts the Roman Catholic Church to which practically the whole population longs, make a constant demand for salted and dried fish from abroad.

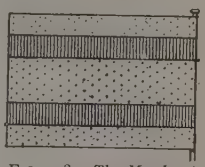
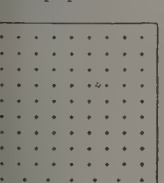


FIG. 198.—*The Merchant Flag of Spain.*

Natural Divisions and Towns.—Judged by the number of inhabi-nts, the small density and slow increase of population, Spain is to be assed with countries of the second rank; it could support three times many inhabitants as it contains. The distribution of the people accen-ates the contrasts between the natural regions. There is a comparatively ense population on the slopes of the bordering mountains, while on the plateau vast stretches of country, like the *despoblados* which occupy 2,000 square miles south-west of Toledo, are practically uninhabited; and in those regions even the population of the provincial capitals is diminishing. Except Madrid, all the large towns lie on the margin of the tableland, which is the only part of Spain where progress is being made, and contains 66 per cent. of the population of the country on 45 per cent. of the area. There the people live in thickly sown villages, and in the Basque province and Galicia in hamlets and isolated farms; but on the plateau, in ite of the complete dependence of the peasants on agriculture, they are ouped entirely in towns scattered 15 or 20 miles apart, the groups of low uses standing on the bare plain with no sign of tree or shrub about them. ain is poor in large towns, even the capitals of the 48 provinces, arbi-ary political divisions without geographical meaning, are small as a rule; ose of the historical regions—the former kingdoms—are larger. All the im-



G. 199.—*Average population of a square mile of Spain.*

portant towns of the marginal belts naturally stand on the sea coast. The fine natural harbours of Galicia have allowed of the establishment of the naval port *Ferrol* and the commercial towns *Corunna*, *Vigo*, and *Pontevedra*; but the ancient capital, *Santiago di Compostela*, famous of old as a place of pilgrimage, lies in the interior. Similarly in Asturias *Oviedo* is an interior town, while its harbour *Gijon* grows rapidly on account of the development of the neighbouring mines. The same is true of *Santander*, the most northerly harbour of Castile, and of *Bilbao* and *San Sebastian*, the chief ports of the Basque province, all of which have a large export of iron ore to the United Kingdom. *Pamplona* and *Vitoria* are fortresses commanding the land routes between Spain and France on the west. In Old Castile the towns of the border district of the tableland include *Leon* and *Astorga* in the north, *Salamanca*, *Avila*, *Segovia*, and *Burgos* in the south, all of them extraordinarily old fashioned, rich in historical memorials, but showing signs of present decay. The hydrographic, and almost geometric, centre of the Douro basin is the larger town of *Valladolid*. In New Castile the peculiar predominant land-forms have also given the marginal towns the highest degree of development; but the central position of this region in the heart of the whole peninsula has introduced other conditions which led to the importance of *Toledo* on the Tagus, the former capital, and still more to that of *Madrid*, the modern capital. Madrid has grown more and more important as a focus of railways, has increased rapidly in population, and grown to be the head and heart of Spain in spite of its situation in a region of little charm, with an unpleasant climate. It has no historical associations, its people have come together merely because all the lines of communication between the marginal towns run through the capital, and it has become the seat of great educational institutions and financial and commercial establishments. The only town of Estremadura requiring mention is *Badajoz* in the Guadiana valley, a fortress on the Portuguese frontier. In lower Andalusia there are three notable towns connected with the Guadalquivir, *Cordoba*, now a mere shadow of its former greatness, but still famous for its splendid cathedral which was once a mosque; *Seville* with many art treasures, and important on account of manufactures and trade; and *Cadiz*, a fortified naval harbour which may be looked upon as commanding the entrance to the river. In upper Andalusia

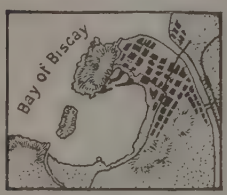


FIG. 200.—*The Harbour of San Sebastian.*

FIG. 201.—*Madrid.*

nada is made famous for ever by the natural beauty of the neighbouring *ga* and the exquisite architecture of the Moorish Alhambra. *Malaga* is export harbour for the wine and fruits of the fertile coast border of dalusia. More to the east *Almeria* and *Alicante* are small seaports, t at the same time, like *Murcia*, characteristic huerta towns, they e their names to the districts of which they are the centres. The al port *Cartagena* owes its importance primarily to its splendid bour, but recently mining has added to its prosperity. *Valencia*, w the third Spanish city in size, has become prominent because is the centre of the richest part of the coastal plain. Catalonia ounds in towns and in industry; chief amongst its harbours is the cient town of *Barcelona*, now the second in Spain and still rapidly owing; it has long since cast into the shade the anciently renowned rt of *Tarragona*. The natural centre of Aragon is *Zaragoza* on the ro, which eclipses all the other towns of the basin of that river.

The Islands and Presidios.—In the **Balearic Islands** the chief vn of the largest island is *Palma*. The harbour of *Mahon* on Menorca minates the whole north-western basin of the Mediterranean. The aniards also reckon with Spain the volcanic group of the **Canary lands** belonging geographically to Africa. The **Presidios,** or Spanish ssessions on the coast of Marocco, are also viewed as part of Spain. *lilla* and *Ceuta* are the most important of these.

The colonial possessions of Spain were once enormous, but have adually diminished as the old colonies became independent republics. e last valuable possessions in America were lost when the Philippine ands, Cuba and Porto Rico were transferred to the United States in 1899. ere remain only a strip of the Sahara coast, and the islands of Fernando , Annobon, Corisco, and Eloby in Africa, none of any importance.

Andorra.[1]—A lofty valley on the southern slope of the Pyrenees, surnded by high mountains, forms a separate State, "the Valleys and vereignty of Andorra," which has maintained its independence for a usand years. Its area is only 150 square miles, and the population does exceed 10,000; the people are more akin to the Spaniards than to the nch and speak a Catalan dialect. The valley of Andorra is drained by Valira, a tributary of the Segre, and is approached from the Spanish of Urgel by a mule-path along the steep gorge of the river. It may be reached from the French town of Ax on the northern slope by a y rough track crossing the crest of the range. The altitude of the ey is about 3,000 feet, and its only resources, apart from a little trade l a good deal of smuggling between France and Spain, consist in the ng of the infertile soil and pasturage on the steep mountain-slopes. isolation of the valley of Andorra has made it the resting-place of ny curious ancient laws and customs. The little State is governed by

[1] By the Editor.

a Council elected by the heads of families and presided over by a Syndic who is appointed for one year. The French Republic and the Spanish bishopric of Urgel, however, exercise certain rights of suzerainty, and each has a representative in Andorra charged with all matters of external policy and justice. The organisation appears to be rather a feudal survival with a divided allegiance than what is usually understood as a republic. The people of Andorra have the reputation of being quiet and taciturn; they are much attached to their old ways and ancient priveleges, and live with austere simplicity. The capital, *Andorra la Vieja*, is a plain stone-built little town of 2,800 inhabitants.

STATISTICS.

	1877.	1887.	1897.
Area of Spain (including Balearic Is.), square miles	192,004	192,004	192,004
Population " "	16,341,201	17,246,688	18,089,500
Density of population per square mile	85	89	92

POPULATION OF CHIEF TOWNS.

	1877.	1887.	1897.		1877.	1887.	1897.
Madrid	398,000	472,228	512,150	Cartagena	75,900	84,000	89,245
Barcelona	277,000	272,481	509,589	Cadiz	65,000	62,500	70,127
Valencia	144,000	171,000	204,769	Jerez	64,500	61,700	60,001
Seville	134,000	143,000	146,205	Palma	58,200	60,500	62,535
Malaga	116,000	134,000	125,579	Lorca	52,900	58,300	59,621
Murcia	91,800	98,500	108,408	Valladolid	52,200	62,000	68,740
Zaragoza	84,600	92,400	98,188	Cordoba	47,800	55,600	57,313
Granada	76,000	73,000	75,054	Bilbao	35,200	50,800	74,093

ANNUAL TRADE (*in pounds sterling*).

	1866–70.	1881–85.	1890–94.
Imports	18,128,000	31,244,400	35,088,000
Exports	12,388,000	27,704,000	32,096,000

II.—GIBRALTAR

By Sir R. Lambert Playfair.

Gibraltar.—The celebrated fortress of Gibraltar is situated on a rocky promontory which rises to the height of 1,396 feet. The town is on the west side, the east and south sides are very rugged and almost perpendicular. The northern side, fronting the narrow isthmus or neutral ground connecting it with Spain, is precipitous and difficult of access. The circumference is six miles, the length three miles, and the area 1,266 acres. In ancient times this was Calpe, the European side of the Pillars of Hercules, the African one being Abyla. The rock now bears the name of its Arab conqueror—Jebel Tarik, or

FIG. 202.—*The Strait of Gibraltar.*

Tarik—who landed here in A.D. 711. It was incorporated with the sh Crown in 1502, and it was taken by the British during the War of ession in 1704. Since that time, notwithstanding repeated efforts by and France, and a protracted siege which lasted four years, Great n has maintained possession of it at a lavish expenditure. The fortifications have been constantly oved and extended, and it may now be considered pregnable as defensive works can make any place. growing importance of Gibraltar as a naval station as a coaling port has led the Government to lay protected harbour with an area of about 450 It was to be enclosed by solid moles, alongside ich the largest battleships could lie. Three large ng docks were to be provided, and the dockyard establishment fitted dertake every kind of repair. The northern mole was to be reserved erchant steamers, with facilities for coaling from the very large s of coal kept in the stores.

FIG. 203. — *Colonial Badge of Gibraltar.*

III.—PORTUGAL

BY CAPTAIN ERNESTO DE VASCONCELLOS,
Portuguese Royal Navy.

osition and Coasts.—The kingdom of Portugal occupies the most rn part of the Iberian peninsula, washed on the south and west by tlantic Ocean. The country lies between the parallels 37° and . and the meridians of 6° and 9° W. Its coast line measures 465 miles, and is formed on the north by hills of moderate t rising inland to mountain ranges. It continues to run south- to a little beyond the Douro, where it begins to change in aspect, ning less elevated, and is bordered by sand-hills, behind which l mountain ranges appear, looking from the sea like a single of which the Serras da Gralheira, Caramulo, and Bussaco are the latter sending out spurs south-westward to near the mouth Mondego and ending in the cape of the same name. To fix the ills and prevent the cultivated land in the interior from being in- by them, the royal pine forests (Pinhal Real) were planted on the n the neighbourhood of Leiria, and protect the stretch of coast from ights of S. Martinho to Vieira beach. Owing to the neighbouring do Bouro, Monte Junto and Cintra, the coast becomes more elevated of Pedreneira, where it bends towards the south-west. Here the Peniche peninsula is formed by steep rocks, off which lie the ga Islands. Cape da Roca, the seaward end of the Serra de Cintra, most westerly point of Portugal and of continental Europe. Near coast forms an ample bay, where the river Tagus has its outlet.

This bay is bounded on the south by Cape Espichel, the extremity of peninsula between the Tagus and Sado. Beyond this point the c formed by the southern slopes of the Serra da Arrabida, recedes eastw to Setubal bar, where it resumes its southerly trend as a flat and sa stretch, till the proximity of the Serra de Grandola makes it mount u once more as far as Cape São Vicente (Cape St. Vincent), the extr south-westerly point of Europe, where it is broken by some ir forming natural harbours. Here the coast turns sharply eastward the river Guadiana, which separates Portugal from Spain. Near F the most important town of Algarve, the coast is sandy. At some dista from, and running parallel with, the beach, long sandbanks rise above water.

Configuration.—The general configuration of Portugal can be c sidered as due to three orographic systems—in the north, the *Tr montano*, or Mountains of Traz-os-Montes (Behind the Mountains), includ as its name indicates the mountains situated north of the river Douro, highest summit of which is Gerez (4,816 feet); in the centre, the *Beira* or Mountains of Beira, including the mountains between the rivers Ta and Douro, the highest of which is Estrella (6,532 feet); in the south, *Transtagano*, or Alemtejo, which includes all the mountain system so of the Tagus, of which S. Mamede (3,362 feet) is the highest.

The country north of the Tagus is the most mountainous and eleva whereas south of the Tagus stretch the extensive plains of Alemt principally near Ourique and Beja, and those of Estremadura between Sorraia tributary of the Tagus and the river Sado, the latter be generally known by the name of Baixas (Lowlands) do Sorraia, near which are the Lezirias, parts of the interior delta of the Tagus, the soil which is extremely fertile. Between the northern mountains there are remarkable plains or Veigas of Chaves and Valença.

Geology.—Almost all the geological formations are to be found Portugal: granite in the north, in Minho, in a part of Traz-os-Montes, a in the centre of Beira and Alemtejo; porphyry in a part of Alemte basalt in the surroundings of Lisbon; gneiss in the Douro district; m schist appears irregularly in different parts; the Palæozoic formations occ part of the north, the centre, and nearly all the southern region; Meso rocks occur between Aveiro and Lisbon, and Cainozoic in the cent Jurassic rocks being abundant in Estremadura, where they form seve mountain chains and the peninsula of Peniche. Deposits of crystall limestone form the greater part of Alemtejo.

Rivers.—The principal rivers of Portugal have their origin in Spa The river Minho, which coming from the Cantabrian Mountains ent Portugal above Melgaço and forms the boundary between the two co tries. Its banks are very fertile, and salmon and lamprey are abunda giving rise to fisheries of considerable importance. The Douro, rising the Serra d'Urbion, crosses Portugal from east to west. Its bed is

en mountains in a narrow tortuous valley, and it receives many aries, the most important of which cross the province of Traz-os-s from north to south. On the right bank, between the tributaries nd Tamega, the Douro irrigates the well-known wine regions, the of which is Pezo da Régua, producing the famous wines which exported from Oporto are known as *Port*. The city of Oporto lies he mouth of the Douro, on the north bank, and faces Villa Nova de the great wine cellar centre.

e Tagus divides Portugal into two nearly equal parts. It rises in the de Albarracim in Spain, and flows south-west to the sea. Between butaries, Erjes and Sever, it marks the frontier with Spain. Near Velha de Rodam, the Tagus passes between two high cliffs, which he celebrated Portas do Rodam, receives the waters of the Ocreza ezere, crosses plains of great fertility, to Lisbon, where it widens out great basin, called the Mar da Palha (Sea), the eastern estuary by which its flow into the ocean, forming in front Portuguese capital one of the best and harbours in the world. The Guadiana Portugal near Elvas, where it is joined Caia, runs south, and receives several aries, forming the so-called *Raia Mol-* (wet-border). Then it curves slightly south-west, running through a deep ocky bed, till it flows into the ocean, en Villa Real de Santo Antonio and onte (Spain). Near the Guadiana are portant copper mines of S. Domingos, are connected by a railway to Pomarão, ost important port of the Guadiana.

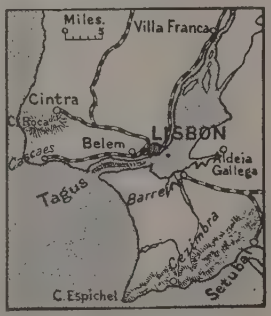


FIG. 204.—*The lower Tagus, showing the Mar da Palha.*

e Mondego from the west of the Serra da Estrella flows past the esque city of Coimbra, and finds its outlet through marshes and salt- t the little port of Figuera de Foz. The little river Sado, one of with their course entirely in Portugal, runs from south to north ıy curves, and when passing Alcacer do Sal widens out through flat where there are celebrated salt-pans, which produce salt of finest ', exported in large quantities from the port of Setubal at its mouth.

ımate.—Portugal, though not extensive, has a varied climate, due, ess, to the great differences of altitude in the country. In the north ld and damp. In the district surrounding the Mondego, temperate and (Fig. 196). South of the Tagus the hot winds from Africa are felt. ıorth of the Douro the mean annual temperature is 50° F.; between ıgus and Douro, the mean at Coimbra is nearly 62° F., and in the ına valley it is over 64° F. The mean temperature in Oporto is 59° the Serra da Estrella only 45°; and in Lisbon 61°. The prevailing

winds blow from the north-north-east, and north-west. The climate on south coast near the Tagus is very genial in winter.

Resources.—The agricultural resources are great, but, unfortunat agriculture is not in as high a state of development as could be desi The staple cereals cultivated are wheat, rye, and maize, the two latte the north and centre, the former in the south. The vine is grown over whole country, producing various types of generous and lighter wi Vegetables and fruit are of the first quality. The oak and chestnut t are the most abundant in the north, and on the Beira mountains. P grow principally on the sea coast, and the olive in Estremadura. Alemtejo the azinheira and sobreira (cork trees), are important, the c taken from the bark of the latter constituting one of the riches of country. In Algarve the fig trees and alfarrobeira (carob tree) are abund The fauna and the domestic animals of Portugal are similar to thos Spain. Sardine fishing and preserving are extensive industries on the co and the tunny caught along the Algarve coast is also cured and preser

The most important mines are those of copper in Alemtejo, and of i in Moncorvo. Coal is worked in Cape Monde and is also found in the neighbourhood of Le Portugal is very rich in mineral waters. Thos Vidago can be compared with the Vichy wat and the sulphurous waters of Caldas da Rai Vizella, and Cucos are also of the best.

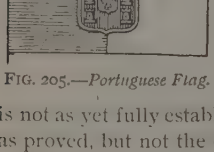


FIG. 205.—*Portuguese Flag.*

People and History.—Owing to insuffici investigation, the origin of the Portuguese peo is not as yet fully established; however, Berber influence can be conside as proved, but not the existence on this part of the peninsula of Liguri and Kelts. History narrates that Turdetans, Turdulos, Suevi, Arabs, passed through at different periods, leaving, as would be natural, eth traces. The Portuguese race is of the Aryan stock, and the Latin fam The language is the Lusitanian, derived from the Latin, and is spoken Portugal, Madeira, Açores, in the Portuguese colonies, and Brazil, and some extent in Ceylon, Malacca, and other places. The Roman Cath religion is established by the State, though other religions are tolerated without public forms of worship.

The Portuguese became famous through their bold adventurous geni Inhabiting the sea coast, the constant vision of the broad ocean inspi them to achieve the maritime discoveries of the fifteenth century w astounded the world. Masters of the sea route to India, they destro by a clever stroke of political economy the commercial supremacy Venice. Portugal then reached the height of her glory, which later s lost on Alcacer-Kibir. Spain annexed Portugal in 1580, and only in 16 by the energy of half a dozen men, did she regain her independence. b her best colonies were lost. The form of government is a constitution hereditary monarchy.

dustry and Trade.—The Portuguese manufacturing industries, long time of decline, have undergone remarkable development since Factories for woollen, cotton, linen and silk textiles are established ɔon, Oporto and other towns, and lace is made in Peniche, Setubal and ores. Woollen and cotton goods find good markets in the Portuguese African Colonies. The manufacture of paper is important, the Almasso being a speciality generally used in the country, and greatly appre- abroad. Glass and china are also largely manufactured. Metals are d principally in connection with cutlery, all kinds of iron goods, rticles in gold and silver. Oporto filigrees are characteristic and e. Gold ornaments are greatly prized by the people, who show their by the amount of jewelry they wear on fête days.

mmerce consists, principally, in the export of wines, cork, fresh inned fish, copper, and fruit; and the import of cereals, cotton, machinery, iron, coal, and sugar. Most trade is done with the d Kingdom, France, Germany, Brazil, the United States, and Spain.

e is carried on principally by means of a main y line, which connects Faro, the most southern of Portugal, with Valença do Minho in the ne north, passing through Lisbon, the centre of ilway system. From this main line others h off along the valleys of the Tagus and the , and to all the principal towns of Portugal.

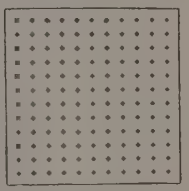


FIG. 206.—*Average population of a square mile of Portugal.*

olitical Divisions.—Portugal comprises, be- her colonies, the "adjacent islands" of the s and the Madeira Archipelago forming part kingdom of Portugal proper. Formerly the istrative division consisted of eight provinces named from north to Minho, Traz-os-Montes, Douro, Beira Alta, Beira Baixa, Estremadura, ejo, and Algarve; and this division is still generally used. The present istrative divisions are 17 districts, most of which are subdivisions of ovinces, made with regard to equality in the population and wealth locality and hence they vary much in size. The districts are divided same principle into *concelhos*, or municipalities, and these again ided into *freguezias*, or parishes.

on, the national capital, is built on the right bank of the Tagus; d by hills and robed with white buildings, it offers the traveller views, not only of the majestic Tagus but also of the surrounding , covered with plantations and parks, spread over the sides of the ing hills. In the neighbourhood of Lisbon is the picturesque loved by Byron, with its castle rising on the mountain crags; the monumental town renowned for its monastery, seen from the n front of a forest; *Cascaes* and *Estoril* on the coast are two favourite resorts. Estoril is also a first-class winter station, owing to its ly mild climate. Lisbon is the seat of the Government and Court,

and also the first commercial port of the country, and the only n arsenal. *Oporto* is situated on the Douro, where the railway crosses b monumental bridge. It is an active and important commercial cen where the most important port wine trade is carried on. Oporto lovely city with splendid views, and fine public buildings. *Setubal*, at mouth of the Sado, is the third port in rank.

The Adjacent Islands.—The *Açores Archipelago* lies between parallels 37° and 40° N., and the meridians of 25° and 31° W., at a dista of 740 miles from Lisbon. It is made up of three groups of islan the eastern, comprising S. Miguel (the largest), Santa Maria and the i of Formigas; the central consisting of Terceira, Graciosa, S. Jorge, P and Fayal; and the western of the two islands, Flores and Corvo (smallest of the Açores). The most notable mountain peaks are P (8,530 feet) and Pico de Vara in S. Miguel, with an altitude of 5,578 f In S. Miguel is the curious volcano crater, named *Lagoa das Sete Cida* (Lake of the Seven Cities), containing four lagoons. The geolog constitution of the Açores is volcanic. The climate is mild and temper

FIG. 207.—*The Açores Archipelago.*

The Açores produce pineapp oranges, cereals, and wine. M cattle are kept and the chief dustries are the making of but cheese, and alcohol. Commerc carried on principally with United States, the United Kingd and the European Continent. Açores are divided into three ministrative districts: Ponta Delgada, with seven *concelhos;* Angra Heroismo with five, and Horta with six.

The *Madeira Archipelago*, about 33° N. and 71° W., includes, besides island of the same name, the Islands of Porto Santo, Desertas, Bujio, Selvagens. The capital is *Funchal*, which is also the seat of the dist government and a stopping-place for passenger steamers betw European ports and South Africa. The highest peak in Madeira is P Ruivo (6,568 feet), and in Porto Santo, Funcho (1,817 feet). The so volcanic. The climate is undoubtedly one of the best in the w enjoying a universal reputation and much recommended to suffer from chest complaints. The principal products are wine, superior sherry, sugar-cane and cereals. There are many cattle. Industry represented advantageously by articles of inlaid wood, cane (ch sofas, baskets), lace, embroideries, and straw hats.

Colonies.—Portugal still stands high amongst the colonial Powers far as extent of territory is concerned. For centuries the chief Europe nation holding African territory, Portugal retains the Cape Verde Islan part of Guinea, the islands of San Thomé and Principe, and the ve important territories of Angola in West Africa and Moçambique in E Africa. There are also some less valuable possessions in Asia.

STATISTICS.

	1878.	1890.	1900.
ea of continental Portugal, square miles	34,345	34,345	34,345
opulation	4,160,315	4,660,095	5,428,629
ensity of population, per square mile	121	135	158
opulation of Lisbon (Lisboa)	242,297	301,206	357,000
,, Oporto (Porto)	105,838	138,860	172,421
,, Braga	19,755	23,089	24,309
,, Setubal	14,798	17,581	21,819
,, Coimbra	13,369	16,985	18,424
ea of Adjacent Islands, in square miles	(?)926	(?)926	(?)926
opulation	390,384	389,634	407,002
ensity of population, per square mile	(?)421	(?)420	439
opulation of Funchal	19,752	18,778	(?)22,000
,, Ponta Delgada	17,635	16,767	17,675

ANNUAL TRADE (*in pounds sterling*).

	1871–75.	1881–85.	1891–95.
nports	6,875,000	8,040,000	8,875,000
xports	5,142,000	5,100,000	7,625,000

PORTUGUESE COLONIES IN 1896.

	Area in sq. miles.	Population.
pe Verde Islands	1,480	114,000
ortuguese Guinea and Islands	4,800	845,000
ngola	484,800	4,119,000
ortuguese East Africa	301,000	3,120,000
ortuguese Possessions in India	1,560	572,000
mor, Macao, &c.	7,460	379,000
Total Portuguese Possessions	801,100	9,217,000

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CHAPTER XXII.—THE RUSSIAN EMPIRE

By D. Aïtoff.[1]

I.—GENERAL

The Russian Empire in General.—Upon a terrestrial globe t Russian Empire appears in the form of a rectangle twice as long as it broad (Fig. 208). Two sides are washed by the sea, the Baltic with three gulfs, the Arctic Sea on the north, and the Pacific Ocean on t east. The southern side is marked by mountains and steppes, the Turk man Steppe, Alai-tagh, Tian Shan, Tarbagatai, Sailugem, Sayan, Yablonov Khrebet, Khingan, Sikhota-alin. The fourth side is open towards Europ and is bounded by arbitrary lines which, for a certain distance, follow t slopes of the Carpathians, separating Russia from the Austro-Hungari Monarchy ; but further to the north a purely artificial frontier winds acro the northern plain of Europe. Within these limits the Russian Empi occupies in one continuous expanse one-twenty-second part of t surface of the Earth, or one-sixth of the land of the globe.

Fig. 208.—*The Russian Empire from a globe.*

In Russia, more than other par of the globe, the geographical a historical evolution of the count has been guided by the config ration of the land. The plain whi stretches from the western confin of the empire to the Pacific p sents no physical obstacle in a part to the expansion of Russia. past ages it has served as the rou for the nomadic peoples who descended from the high plateaux of A and swept onwards to conquer Europe or to dwell in its unoccupie territories. Later, the Slavs who settled in what is now Russia formed bulwark to western Europe, and stopped the invasions of the Asia hordes which made their homes in the south of the country. T Mongols, having made themselves masters of all the Slavonic principalit served as a sort of cement to bind together these disunited States, an thus helped forward the formation of a country which two centuries lat became strong enough to drive them out. For several subsequent cen turies the Russian plain was the theatre of the wars of the Muscovit State, by which the Asiatic hordes were conquered and the dying powe

[1] Translated from the French by the Editor.

land extinguished. Finally, it was in the Russian plain and not in ant that the empire of Napoleon was shattered.

hile most of the rivers of Europe take their rise in the mountains, the st streams of European Russia have their source in the moderate tion of the Valdai hills, the height of which scarcely exceeds 1,000 From this region the rivers flow to the Baltic, the Arctic Sea, the Sea, and the Caspian. By a singular and happy chance the rivers traverse the Russian plain spread through the country like the al or venous system of an organised body. The Volga, the Dnieper, una, and the Niemen rise close together and diverge to the furthest of the country; and some rivers such as the Don and the Volga, in distant regions, approach until they almost touch and, although no ent obstacle prevents their meeting, separate again to fall into ent seas. Again, the Dnieper, the Bug, and the Dniester, coming distant sources, converge to what may be termed a single estuary.

he Russian plain, no part of which exceeds 1,150 feet in height, ally forms a single climatic region; atmospheric disturbance can be gated over the surface without encountering any obstacles from the r of the White Sea to that of the Black, and from the plains of rabia to those of the Pechora. The winds which blow from the c Sea reach unchecked the borders of the Euxine, and conversely the nce of the southern breezes is felt along the slopes of the Ural and the shores of the Polar waters. It is true that the mean temperature very considerably from north to south; in some parts of the north ven colder in summer than it is in winter in more favoured spots; he transition between the various climates is so gentle as to be ceptible.

he Russian Empire and the Russian People.—It was in this and at first in the very region where its great rivers rise, that the ovite kingdom had its origin, grew, and strengthened until it became ussian Empire, which originally an Asiatic power in Europe is now a ean power in Asia. The dominant character of the region which iven birth to Russia is monotony: one land, one climate, one flora, una, one race. In its growth the Russian Empire has come in t with countries of an entirely different type, and has incorporated so that now it possesses every variety of surface and scenery. Like ine with the Dead Sea, Holland with its polders, and the United with Death Valley, Russia contains an area of depression, that of spian, larger than all the other sunk plains in the world put together. the mountain chain of the Tian Shan must cede the supremacy to the ayas and the Andes, yet the peak of Khan Tengri exceeds 24,000 feet, tude equal to that of the culminating summit of the Carpathians added giant of the Alps. Even at the doors of Europe, Elbruz, Kazbek, and l other summits of the Caucasus exceed 16,500 feet. In the south, s more extensive than all the savannas and prairies of America; in

the north, vast tundras, on which the hold of frost never relaxes ; in
north-west, a lake region, smaller indeed than those of America c
Africa, but yet of great size ; here a region of black earth of extraordi
fertility, there solitudes greater and less known than those of the far
of America or the centre of Australia ; finally, from the Crimea to K
chatka a belt of wild and picturesque mountain chains. Such are
varieties of land and scenery within the Russian Empire. Strikin
these diversities are, they are paralleled by those of the inhabitants of
empire. Just as the central plain is surrounded by regions of the gre
variety, so the people of the Great Russian branch of the Slav race
surrounded by a number of races incomparably greater than in
other country of the world. These include Slavs of the Polish bra
Jews, Tatars, more than thirty different races in the Caucasus al
Kalmuks, Turkomans, Tunguses, Yakuts, Koryaks, Samoyeds, Osty
Voguls, Finns, and many others. From the point of view of relig
beside the great body of members of the Orthodox Greek Church, t
live believers in all creeds and in none—Freethinkers, various sectari
the Greek Church, Protestants, Roman Catholics, Moslems, follo
of the Jewish persuasion, who are not all Semites, Buddhists, B
manists, and Fetish worshippers, or simple Pagans. Russia is no
varied when considered from the moral and intellectual standpoint.
by side with the absolutism of the Government is the indepen
spirit of the moral leaders of Russian society ; custom has an al
Asiatic power, yet there is an entire want of tradition ; obliga
membership of the all-powerful Orthodox Church is confronted with
utter Atheism of the intellectual and with hundreds of different sects, s
ritualistic, some rationalistic : such is "the Russian people."

Natural Divisions of the Russian Empire.—The central nuc
of European Russia is a slightly undulated plain rising to a mode
elevation somewhat to the north-west of its geometrical centre, and gi
rise to all the great rivers of the country. It is the river system w
distinguishes this plain from all others. In the north-west the *Lake Re*
is unique in the complex mingling of land and water. In the south-
there is a region very distinct in its natural characteristics, but witho
special name ; it might be termed Transdnieperia (from the Russian p
of view), or *Carpathia*. In the south, separated from the Russian plai
lowlands or even sunk plains, comes the great chain of the *Caucasus*,
its western prolongation, the *Crimea*, and its eastern termination in
highlands of *Transcaspia*. In Asia two varieties of steppe are t
distinguished, the high and the low, the latter sometimes sinking be
the level of the sea, the former rising to elevations of many thousand
but both presenting the same characteristics of land surface, climate, fl
and fauna. The vast territory of *Siberia* sloping wholly towards the n
furrowed by its immense but useless rivers and with a rigorous clim
supports upon an area greater than all Europe no more inhabitants t

ll in the single town of London. The last of the varied natural sions of the Russian Empire is the mountainous land of the *Transbaikal unce* and the *Pacific slope*. Each of these regions is remarkable for the y of its geographical features, and each will be described in the order n above without special reference to administrative subdivisions, the ndaries of which have no relations to natural features.

II.—CONFIGURATION

Central Russia.—The natural region of Central Russia is bounded he north-west by the Lake Region; on the west its limit is the depres- which runs from the Black Sea to the mouth of the Oder by the eys of the Dnieper and the Pripet and the plains of the Vistula; on the th it is bordered by the low steppes and the depressions which mark he Caucasus; and the east by the pes between the ga and Ural, the hchii Syrt, and chain of the Ural, le further north nerges without a ak into European eria.

FIG. 209.—*Central Russia—Area above 600 feet in elevation shown in black.*

A gentle elevation ne surface defined he contour line of metres (say 600) extends from the l of the Mologa 8° N. in a south- h-easterly direction to Kharkov in 50° N. It culminates in the Valdai at an elevation of 1,150 feet. A second smaller "island" of high nd extends from north to south along the right bank of the Volga 1 Kazan in 56° N. to Kamyshin in 50° N. A third and smaller and" of the same elevation lies to the south of the Donets, a utary of the Don. If we consider the central mass of Russia as nded by a lower contour line (that of 425 feet), a western projection be observed occupying the whole space between the Pripet on the h, the Duna on the north, and the meridian of Dvinsk on the west. top of the entire region in which the principal rivers rise is a land of ips, and appears to be an almost dead level. All the great rivers of ral Russia have arrived at a state of mature adjustment to the land, ng drained their ancient lakes and established their individuality as systems. They carry an enormous volume of water, although com-

pared with its area, Russia is traversed by a much smaller volun running water than western Europe.

The Volga.—The *Volga* is the first of Russian rivers; it is the lo and has the largest volume of water in all Europe. Rising in a peat the little stream flows through a series of lakes, and on leaving Lake V it is a considerable river with a volume of from 110 to 1,320 cubic fee second, according to the season. Its first important tributary is Selizharovka, which flows from the lake of Seliger, and at the confl of these two rivers, which are of almost equal volume, the true cour the Volga may be said to commence. The tributaries on the left flow from the low watersheds which separate the Volga from the systems of the Baltic and the White Seas. At Nizhnii-Novgorod it u with the Oka, a river of equal size, but much greater historical import The Oka was long the frontier between the Tatars and the Slavs, a flows through the very centre of the European Russia of to-day; fro source in the Black Earth region it waters the most fertile part of Russia along a course of 970 miles, and where it enters the Volga almost a mile in width. About 60 miles below the point where the V turns to a southerly direction, it receives on the left bank the Kama, w brings in the drainage of a region larger than the United Kingdom. Kama and the Volga are nearly equal in volume, but the water h different colour, that of the upper Volga being grey, and of the K yellow. The united river flows on in the direction of the great tributa far as Simbirsk, where the volume of the stream is as great as it is mouth. Below Simbirsk the Volga closely follows the base of a calcar plateau which causes it to make a sharp bend at Samara. In its l course the great river divides into several branches, the most weste which retains the name of Volga and the most easterly is called Akh Between Simbirsk and Samara the banks of the Volga are very picture the hills of the right bank rising abruptly for more than 300 feet abov water, present indeed an almost mountainous appearance. The K Klyuch, south-west of Syzran, rises to 1,100 feet above the average lev the river, and other summits reach 600 or 800 feet, forming impo heights compared with the almost imperceptible swellings which ri the surface of Central Russia. The uniform low level plain which the left bank presents the most striking contrast.

The Western Rivers of Central Russia.—While the Volga is greatest of Russian rivers, the "Mother Volga" of the Great Russians *Dnieper* in its own region is no less honoured; the Little Russians c "Father Dnieper." It rises only 50 miles from the source of the V and although shorter (1,330 miles), its drainage area is as large as Fra The Dnieper receives few tributaries in its upper course as far as Smol and Mohilev, but below Rogachev it receives successively three g tributaries, the Berezina, the Pripet, which traverses a region of swa now in large measure drained and converted into meadows, and the Do

ow the confluence of the Desna the left bank of the Dnieper is every-
re low, while the right bank rises in cliffs to the height of 300 and 400
; and the course of the stream is obstructed by rapids (*poroghi*), which
e mentioned by the early Byzantine chroniclers.

The third river which flows from the central plateau is the *Duna*, or
tern Dvina, which is the great river of the White Russians and
uanians. Originating as the outflow of Lake Okhvat, only 12 miles
n Lake Volgo, the Duna flows to the south-west as far as Vitebsk, and
, turning at right angles, it flows north-westwards to its mouth in the
of Riga. It has no tributaries of any importance, and its banks are
and marshy. The Velikaya, the Lovat, and the Msta belong by their
ths to the Lake Region, and the Sukhona, the main branch of the
thern Dvina, will be described in the section on Siberia.

The *Vistula* is essentially a Polish river. It enters Russia as a consider-
stream, navigable by large vessels from the confluence of the San,
leaves it as a majestic river carrying a volume of at least 8,000 cubic
per second to the Baltic. It receives no tributaries beyond the
tier, its most important affluents being the united Bug and Narev.

The *Don* and its upper tributaries rise in the central swelling of the
sian plain, which also gives origin to the Volga, the Dnieper, and the
a. It is one of the largest rivers in Europe, having a breadth in some
es of 18 miles during the spring floods, although the droughts of
mer reduce its volume to such a degree that navigation is very difficult
n for light-draught vessels on account of the shallowness of the channels
the number of sand-banks; some of the tributaries dry up completely.
largest tributary is the Little Don, or *Donets*, which was navigable
n to the seventeenth century, but has since been reduced in volume
ccount of the destruction of the forests which covered vast areas of
hern Russia. Now navigation is possible only in the lower course of
iver when it is in flood. The basin of the Donets is commercially
ortant on account of its coal-mines, which are worked here and there
an area of 9,000 square miles.

outh-Western Russia.—This region, which we suggest might be
d *Carpathia*, extends on the north to the low plains of the Vistula
Pripet, on the east to the valley of the Dnieper, while on the west it
olonged into Austria-Hungary and Rumania as far as and beyond the
athians and the Transylvanian Alps. Elisée Reclus says of it: "From
eological point of view the depression which joins the Black Sea and
Baltic through the valleys of the Dnieper and the Oder separates two
ent worlds; on each side everything is unlike: the outline of the
urs, relief of the land-forms, and the folding of the strata. On the west
author should have said on the south] the land is the result of frequent
complicated geological changes; on the east it bears the impress of
nd regular oscillations." The culminating point of this district, cut
re and there into superb escarpments and beautifully diversified by

forests, is in Poland, where the St. Catherine beacon on the Bald Mou
(*Lysa Gora*) reaches a height of 2,003 feet; and in Russian territor
Castle of Kremenets reaches 1,309 feet. The rivers of this region ar
Bug, the Dniester, and the Pruth, a tributary of the Danube. The *D*
is the largest, rising in the forest region and crossing the land of the
earth and the bare steppes to the south of it; and although it is one
most tortuous rivers on the surface of the Earth its bed is very deep
into the strata across which it flows.

The Lake Region.—The region of the northern lakes inc
Finland and the Russian governments of Olonets, Novgorod, St. P
burg, and Pskov. The fact that the government of Novgorod
contains 3,200 separate lakes and that of Olonets 2,000, is sufficient j
cation for the name. The parts not occupied by sheets of water
marshes consist of isthmuses and peninsulas; the lakes, as a rule,
municate with one another. The highest part of this region is in the
where some summits exceed 3,000 feet. Southern Finland and
Russian part of the region contain no mountainous elevations, the h
hills being rounded knolls worn by the action of the ancient ice-shee
other part of Europe abounds in erratic blocks to such an exte
Finland, and many of these are so large that the peasants build h
in their shelter. The ancient glaciers have left the marks of
passage deeply engraved on the surface of the land, and the general
of the country are everywhere due to glaciation. There are few
marked land surface features in the world than the parallel valleys
descend to the Gulf of Bothnia, both on the Finnish and Swedish side
the same phenomenon occurs in the interior. In many parts of the co
the general alignment is of almost geometrical regularity; hills,
marshes, and chains of boulders running parallel to one another
north-west to south-east; and all public works, embankments, cut
lines of communication, even the streets of villages and of towns
necessarily to follow the same direction. The whole of Finland is spri
with lakes, lagoons, and marshes; the lakes, indeed, forming such a
rinth that it is impossible, without paying the most minute attenti
trace the watersheds separating the drainage areas of the Gulfs of Bo
and Finland and of Lake Ladoga, the zone of separation being frequ
a tract of almost level marsh. Amongst the more important lakes of Fi
may be mentioned the little-known Enere, Saima, which has been unit
canal since 185 with the Gulf of Finland, and Päijänne, which empti
the Kymmene Elf into the same gulf. The rivers which unite the
sometimes spread out to a wide expanse and sometimes form rapid
most celebrated of which is the grand cataract of Imatra in a g
gorge which interrupts the course of the Vuoxen.

The Larger Lakes.—The Russian portion of the Lake R
includes 15,500 square miles of water surface. *Lake Ladoga* is the
and still the largest lake in European Russia, and fifth in size in al

pire, ranking next to the Caspian, Aral, Baikal and Balkhash. In former s its dimensions were much greater, for it formed one basin with the Gulf inland. From the low southern shore, an almost treeless, boulder-strewn on of glacial origin, the lake bed descends by a gentle slope towards depths whence rise the granite cliffs of its northern coast. The average h is estimated at almost 300 feet (50 fathoms), which gives a total me of water nineteen times as great as that of the Lake of Geneva. water is, as a rule, very clear and remains cold at all seasons ; even in ust the surface temperature scarcely exceeds 54° F., and in May it is 36°. Lake Ladoga is frozen over for about 120 days in the year, from ember to April. Near Valaam Island masses of ice have been sured piled up to a height of 75 feet, and presenting from a distance appearance of hills of weathered schist. The gales which frequently v over this lake raise high and confused waves followed by a heavy nd swell. Notwithstanding the freezing of the lake its animal life is abundant, including not only fish, but a species of seal which may be in winter on the edge of the ice cracks. The river Neva, flowing the lake into the Gulf of Finland, has a length of 43 miles, and carries lume of water equal to that of the Rhone and Rhine united. *Lake ga* is for the most part very deep, and near the centre soundings of feet (120 fathoms) have been obtained. The northern side of the lake is numerous bays running towards the north-west, and prolonged ards Lapland by chains of small lakes and by rivers following the same ction and separated by lines of hills between 800 and 1,000 feet in ht ; these features running parallel to those already noted in Finland. e Onega communicates with the White Sea by a series of lakes and s, and with the Gulf of Finland by the river Svir, which flows into e Ladoga. Its tributary, the Vitegra, brings it into connection with Volga system on one side, and with the Mezen on the other. *Lake n* is really nothing more than a permanent inundation formed by a ber of rivers which meet at a point whence the outlet is not large gh to carry off the whole of the water ; its depth does not exceed et, and the waters are almost always muddy. The Volkhov, which es off the overflow of the lake, is the chief affluent of Lake Ladoga, is a muddy river throughout its whole length. The streams which in Lake Ilmen are the Shelon, Lovat, and the Msta, which places it mmunication with the Volga. *Lake Peipus*, the southern branch hich is called the Lake of Pskov, has a north-north-west and south-east direction, like Ladoga and Onega. Its average depth is 30 feet and at the deepest point it only reaches 90 feet, yet it remains n for a shorter time than the other Russian lakes. It receives the ya and the Embakh, which places it in connection with the Gulf of and its own outlet is by the Narova to the Gulf of Finland.

ie Crimea.—The Crimea, which we consider as a prolongation of Caucasus, is placed entirely outside Russia by its geological structure.

The southern slope of the Yaila Tagh is for the Russians a second
far as climate, vegetation, and the appearance of earth and sky can
so. "Like the Caucasus," says Elisée Reclus, "the Crimea is one
districts which has contributed most to develop the love of nature
modern Russians." The mountain chain which extends along th
east of the Crimea is little more than 100 miles in length, and it
nating point has an elevation of 5,060 feet. Although a hundred fe
the best known of its summits is the Chatyr Dagh, which may be
an example of a land-form common in this district, a limestone
into battlements, which from a distance presents the appearance o
tent. There are few rivers in the Crimea, the largest of them b
Salgir.

The Caucasus.—As a mountain chain the Caucasus is remark
the unity of its geographical features and its general orientation, t
running direct from south-east to north-west with only the smalle
tions. Each end of the chain forms a peninsula, that of Apshero
Caspian on the east, and that of Taman in the Black Sea on the we
latter is only separated from the peninsula which forms the east
mination of the Crimean range by the narrow Strait of Kerc
peninsula of Apsheron is continued across the Caspian by a s
volcanic islands and then by a submarine ridge, and beyond tha
runs eastward as a chain of heights, either mountains, hills, rocks
scarped edges of plateaux, as far as the valley of the Murghab betwe
and Herat. The range of the Caucasus is 750 miles in length
divided almost exactly half-way between the two seas into two
parts by a depression through which the great military road passe
Darial defile. At this point the range is only 60 miles wide betw
northern and the southern plains, while the western Caucasus is tw
the eastern two and a half times as wide as the constricted portio
divides them. The western Caucasus contains the highest s
Elbruz, Koshtantau, Dikhtau, and two other peaks surpassing the
of Mont Blanc. The eastern Caucasus is lower than the west
less uniform, more varied in outline, and the spurs which rami
the central ridge in various directions give rise to a labyrinth of
The general relief of the Caucasus is formed almost throughout by
in some places by three or four, ranges running parallel to one an
only slightly diverging, and connected here and there by knots. T
chain may be considered to be that which forms the watershed, a
in several parts of the system it is not the most elevated, Mount El
instance, rises to the north of it. From the orographic point of
loftiest summit of the Caucasus is Koshtantau, which rises on th
shed, and is the highest granitic mountain of the range. As a
southern slope of the Caucasian ranges is much more abrupt t
northern. The regularity of structure is as apparent in the great ge
features as in the general relief, at least upon the northern side. T

n is composed throughout of crystalline schists resting here and there granite, and diminishing in extent from west to east. On both sides of central chain the slopes consist mainly of calcareous and silicious strata ifferent ages, Jurassic, Cretaceous, and Eocene; to the north these s dip under the Pliocene and Recent formations of the steppe. Near middle of the chain, where it is constricted, the high valley of the k forms a sort of geological gulf in which a great horizontal eau of Tertiary sandstone advances like a peninsula in the midst of Cretaceous strata. Elbruz, the highest summit of the Caucasus, is an ent volcano, and Kazbek is also a trachytic cone. Thermal springs are edingly abundant. The peaks of the Caucasus, although higher on whole than those of the Alps, are not so heavily enfolded in snow ice. This is due not only to their more southern latitude and other atic conditions, but also to the narrowness of the high ridges and absence of corries in which the snow could accumulate in extensive s. The snow line varies much in its position; on the western flanks Garibalo it comes down to 8,300 feet, while on the north-west of Great rat it reaches only to 14,300, and Alagœz, 13,500 feet in height, is rely free from snow in summer. The average height of the snow- is about 2,000 feet higher in the Caucasus than in the Pyrenees ch occupy the same latitude.

The plateau of Armenia, separated from the Caucasus by the narrow ow in which the Rion and the Kura flow, is only partly in Russia, and be better described in the general account of Asia. Its highest summit Mount Ararat, where three empires, Russia, Turkey, and Persia, meet.

The Kuban is the chief river of the Caucasus, with a length of 550 s, and next to it rank the Kuma, the Terek, and the Manych. They all a very variable volume; in spring and in autumn they are swollen he melting of the snow or the fall of rain, and consequently inundate low grounds, but in summer they shrink enormously after leaving the ntains, partly on account of evaporation and partly because of the ntity of water diverted from them for purposes of irrigation. The a terminates in the midst of a reedy swamp sixty miles from the ian. On the south of the Caucasus the Ingur, Rion, and Chorokh to the Black Sea, while the Caspian receives the Kura (830 miles), its scarcely less important tributary the Araxes (640 miles).

The Aralo-Caspian Basin.—There is no general name for the n which lies between the Caspian on the west, the plateaux of Persia Afghanistan on the south, and the Pamirs on the east, stretching to the Shan and the Tarbagatai on the north-east, to Siberia on the north, merging on the north-west into the steppes which lie between the and the Caspian. The three provinces of Syr-daria, Samarcand, Ferghana bear the name of *Turkestan*. The northern part of the n, from an administrative point of view, forms the General Govern- of the Steppes, and the country between the Amu-daria and the

Caspian is termed the Transcaspian district. The whole regio
made up in almost equal parts of highlands and lowlands; on one
mountains rise to heights of from 20,000 to 23,000 feet, while on
other side the surface sinks to the Caspian 85 feet below the level of
sea. Notwithstanding this diversity the region presents a remarkable u
especially with regard to climate. In July the temperature ranges betw
68° and 77° F. on the average, the temperature of the Cape Verde Isla
but in January the average is from 5° to 23° F., the same as in the hea
Canada, in southern Greenland, or in Spitsbergen. The range of extr
temperature is no less than 133°, from 111° F. to —22°. Another ge
characteristic is the progressive dessication of the country. The Syr-d
and the Amu-daria were formerly of much larger volume and prob
united in one stream which flowed to the Caspian. The great lakes,
as Lake Balkhash and Lake Aral, have shrunk in their dimensions, thos
the high plateau have been partly emptied like Issyk-kul, and others
completely disappeared. In consequence of this dessication a large
of the country, in the mountains as well as on the plains, has assumed
character of the steppes. On the Pamirs, in the Tian Shan and the

FIG. 210.—*Relative areas of the Tian Shan, Alps and Pyrenees—after Reclus.*

bagatai, every longi
nal valley and ev
hollow is a steppe,
vegetation singularly
stricted both as to nu
of species and the an
period of growth w
is limited to t
months in the year.

The Tian Shan, the Alai-tagh, the Alai, and the Trans-Alai, are
principal mountain chains of Turkestan, the two latter being the ramp
of the Pamirs, which completely separate the two parts of Asia.
vastness of the Tian Shan is clearly shown by the accompanying fi
adapted from the "Géographie Universelle" of Elisée Reclus. It incl
steppes, deserts, half-dried lakes, and salt marshes. The Pamirs, w
form the meeting-place of the three great empires of Asia, are describ
the general account of that continent.

The Steppes.—The steppes which extend through the whol
Turkestan and across the river Ural into the interior of Russia form a
naked land, except during a few weeks of spring and summer, when
are clothed as if by enchantment with verdure and flowers. Deserts,
perly so called, extend over half of the plain of Turkestan between
watershed of the Ob and the plateau of Iran; the most famous is
Bek-Pak-Dala, or Hunger steppe. The whole country is sprinkled
lakes, with funnel-shaped hollows, and salt marshes side by side
lagoons and lakes of fresh water. Of the numerous rivers which form
emptied into Lake Aral two alone now reach it. The *Syr-daria*

xartes of ancient authors and the Seihun of the Arabs) rises in the heart of e Tian Shan. As it flows across the steppe the great river diminishes in lume more and more, on account of the abstraction of its water by irri- tion canals which change a great part of the barren plain into smiling rdens. Between the Syr-daria and the Kara-daria the whole country is ltivated, shaded by trees, and musical with running water ; it is the ost fertile part of Turkestan. Sandy districts lacking the water necessary fertilise them form little deserts here and there, and a zone of sterile d uninhabited country stretches along the right bank of the river. The ost important of the streams which flow towards the Syr-daria, but dry without reaching it, is the Chu.

The *Amu-daria* (the Oxus of the ancients and the Jihun of the Arabs), ore than 1,550 miles in length, is formed by two rivers, the Aksu, which probably the more important, and another issuing from Lake Victoria on e Pamirs, which was discovered by Wood in 1838. The Surghab, fed by e snows of the Trans-Alai, joins the river lower down ; beyond that the xus escaping from the gorges of the outer heights of the Pamirs only ceives tributaries of minor importance. Below the tributaries flowing from estern Badakhshan it does not receive another drop of water from the uth ; all those rivers, including the Zarafshan, which would naturally ve flowed to it, are either diverted for irrigation or are drunk up by the satiable sands of the desert. The Murghab, which was formerly a ibutary of the Amu-daria, is now exhausted in forming the oasis of Merv ng before it reaches the great river. The changes which the course of e Oxus have undergone during the historic period, are among the most traordinary phenomena of physical geography. During the first half of e sixteenth century it was one of the feeders of the Caspian ; this is indeed only a temporary phenomenon, for since the period of the Greek storians it has twice been turned from the Caspian to Lake Aral. In rabo's time the Oxus, "the largest river of all Asia, with the exception of ose of India," fell into the Caspian Sea ; but on the map of Idrisi, the ihun and the Jihun flowed together into Lake Aral.[1]

Very few rivers flow into the Caspian on the Asiatic side. The largest of em is the *Ural*, which is usually considered as the boundary between rope and Asia. It is long, but narrow, and of small depth ; its only portance lies in the very considerable fisheries between Uralsk and the uth. The largest lake of the region is usually termed the Aral *Sea ;* it s an area of more than 23,000 square miles, and is filled with very salt ter. The next in order of size is Lake Balkhash, which extends for 340 les from west to east. Both lakes are very shallow and, like all the sheets water in this region, are diminishing in extent.

Siberia.—Siberia forms a plain far more extensive than that of ropean Russia. Its special character is the regular slope of its surface

[1] See the author's reduction of the 70 maps of Idrisi's Geography in Schrader's *torical Atlas*, Paris, Hachette.

from south to north, as is indicated by the direction of all the Sibe rivers. The Tian Shan, Alatau, Tarbagatai, Altai, Sayan mountains, A Tree (Yablonovyi) chain, and the Dorsal (Stanovoi) chain separate it on south and south-east from Mongolia and the Pacific slope. The na of the land divides Siberia into two parts : Western Siberia, which inclu the north of Russia in Europe from which the extremity of the Ural ra scarcely separates it, and Eastern Siberia. West of the Yenisei the cou is low, covered with rich soil or sheets of water, marshes, and tremb meadows. The watershed between the Ob and the Yenisei, for instance, imperceptible that according to the direction of the wind the water of marshes which compose it flows out sometimes to one river, sometimes to other. The steppe of Baraba, between Omsk and Tomsk, is as flat as the face of a lake, and the soil is formed of sand so fine that the inhabitants h no idea what a stone is like. Between the Tobol and the Ob the count one huge marsh, impassable in summer except along the margins of rivers which drain off the superfluous moisture of the land in t immediate neighbourhood. The only mountain chain of any importa west of the Yenisei is the Ural, which runs from north to south along meridian of 60° E. for 1,500 miles, with a breadth varying from 1¼ to miles. It is built up throughout of crystalline rocks covered by regul disposed strata and contrasting with the uniformity of the neighbou plains. In the north and in the south the Ural mountains rise to 5,300 but in the centre their elevation is so slight that one crosses the c between Perm and Yekaterinburg without seeing more than some ge rounded and hardly recognisable eminences. In spite of its north situation the Ural has no glaciers, the snow-fall being insufficient, account of the dryness of the air, to produce permanent snow fields. only in some of the deep ravines with a northern exposure that any s remains unmelted during summer. East of the Yenisei the land is diversi and stony, with outcrops of solid rock appearing here and there, and it c rises into groups of hills which are difficult of access. Mount Makachi the highest summit north of the Arctic circle, reaches a height of 8,500 f

Pacific Slope.—The mountains which traverse Asiatic Russia f south-west to north-east are divided into a series of highlands, plateaux, chains. From the Tian Shan to the Sayan these mountains form the bo dary between the Russian and Chinese empires ; further east, where Russian frontier runs furthest to the north, the highlands, of an aver altitude of from 6,500 to 10,000 feet, constitute the border chain of the g inclined plain of Siberia. From the high plateau of Transbaikalia, boun on the south-west by the Khamar-Daban and the Sokhondo, 9,200 feet h the Apple Tree chain (*Yablonovyi Khrebet*) branches towards the north- but contains no summits of an equal height. From the shores of the Se Okhotsk the whole eastern region is very diversified, and the forms of land are most abrupt in the neighbourhood of the sea. The edge of Siberian high plain, to which the land rises imperceptibly from the no

st, is sharply scarped when seen from the Pacific side, and bears the name the Backbone or Dorsal chain (*Stanovoi Khrebet*) which Middendorff posed to call *Stanovoi Vodorazdel* or Main Divide. This edge, which is properly represented on maps in the form of a mountain chain, is lly composed of heights, hills, mountains, or plateaux, still little known, l winding from the Transbaikal plateaux to Cape Dezhneff (East Cape), a tance of 2,500 miles.

The island of Sakhalin, separated from the mainland by the strait known the Gulf of Tartary, resembles the neighbouring coast of Russian Man- uria in its configuration. The mountain chain which borders the west st rises here and there into real peaks of from 3,000 to 5,000 feet in height. Finally, the mountains of Kamchatka, although attached to the Stanovoi rebet, differ from it completely. They are the highest, after the giants of the n Shan, and are the only mountains in Russian territory which continue canically active. The highest of the many volcanoes of the peninsula is unt Klyuchev, which attains to within a few feet of the height of Mont nc. Most of the volcanoes of Kamchatka, ten of which are in full ivity, are ranged in a single row along the east coast. Although smoking ntinually and sometimes glowing with molten lava, these mountains stand thed in eternal snow and covered with glaciers.

The great Khingan and the Sikhota-Alin, running from south-west to north- st, are two ranges distinct from the other mountains of Asiatic Russia.

Rivers of the Arctic and Pacific Slopes.—The rivers of Siberia amongst the largest in the world. If we only suppose that half of annual precipitation is carried by them to the sea, the volume of Ob and of the Yenisei must in each case exceed 110,000 cubic feet second, or more than four times that of the Rhone and the Rhine, they vary greatly throughout the year. In winter the frozen surface rds the movement of the deeper water, and the small streams are npletely stopped. The largest rivers of Siberia and the north of ropean Russia are, in Europe, the Northern Dvina and the Pechora, in Asia, going from west to east, the Ob with the Irtysh, the Yenisei, Lena, the Amur, and a dozen other streams which would elsewhere considered great rivers, but appear insignificant in comparison with se which have been named.

At the junction of its two main branches, the Sukhona with the Yug the Vychegda, the breadth of the *Northern Dvina* is more than two- ds of a mile; further down, after receiving the Vaga and the Pinega, preads over a space which varies from two to four miles in breadth n bank to bank, and its delta on the White Sea has an area of 440 are miles. The *Pechora* and its principal tributaries rise on the slopes he Ural mountains, and the river is larger in every way than the na; its delta on the Arctic Sea having a length of 125 miles.

The *Ob* and its tributaries drain an area almost equal to that of western ope (1½ million square miles). Judged by length and directness of

course, the Irtysh and not the Ob is the main river of this system. It r
in Mongolia, where at first it bears the name of Urungu and later Ulyun
and it is only where it leaves Lake Zaisan that it receives the name
Irtysh, which it bears to 60° N. The Ob and the Irtysh are navig
throughout almost their whole length ; in summer all the large tributa
and, during the spring floods, several of the second rank admit of
passage of barges and light-draught steamers ; the whole navigable dista
of the Ob and its tributaries together exceeds 9,000 miles. At its mo
on the Kara Sea, the Ob is more than five miles wide and has a depth
from five to fifteen fathoms.

The *Yenisei*, like the Ob, is shorter than its chief tributary, which r
in Mongolia where its principal branch is called the Selenga ; it flows
Lake Baikal, whence it escapes under the name of the Upper Tungusk
Angara. The Yenisei itself is formed by the junction of the Ulu-Kem
the Bei-Kem in a corry of the mountain range which continues the Sa
range on the east, then after escaping from its high mountain basin
succession of defiles cutting across the parallel ridges of the Sayan
flows straight northward to the Arctic Sea. The chief tributaries of
Yenisei come from the east. The most northern of these is the Lo
Tunguska, which places the basin of the Yenisei in communica
with that of the Lena. The tributaries on the left bank, all of wh
are comparatively short and insignificant, give access to the basin of
Ob. The Yenisei enters the Arctic Sea at the head of the long Gul
Yenisei, which is separated from that of the Ob by a low and comp
tively narrow peninsula.

The *Lena* rises about 30 miles from Lake Baikal ; it is the largest r
of Eastern Siberia, and lies wholly within the Russian Empire. In its up
course the scenery is very picturesque. The only tributary of
importance which it receives on the left bank is the Vilyui ; but
the right from the Vitim plateau, the Olekma and the ample Al
double the volume of the upper Lena. From the confluence of the la
stream the bed of the Lena has a breadth of from four to five miles f
bank to bank, and in some places the river expands into lake-like reac
Unlike the Ob and the Yenisei, the Lena enters the Arctic Sea by numer
branches which form an immense delta.

The *Amur*, formed by the union of the Shilka and the Argun, flow
first in the same direction as the upper Lena, then from the confluence
the two branches to its mouth it describes a semicircle of alm
geometrical exactness. Few rivers have to traverse a country so bro
with mountain ranges, the most important of which are the Great and
Little Khingan. Being as large as any of the three great northern river
northern Siberia the eastward course of the Amur gives it a spe
importance for the expansion of Russian colonisation towards the Pac
and it is by the valley of a southern tributary, the Ussuri, that Vladivos
is reached.

Lake Baikal is the largest accumulation of fresh water in Asia, and is of ormous depth, the soundings in some places exceeding 700 fathoms, the erage depth of the southern portion being 140 fathoms.

III.—CLIMATE AND ANTHROPOGEOGRAPHY

Climate of the Russian Empire.—In the first part of this scription of the Russian Empire a simple statement of facts could alone made without any attempt at explanation in the present staté of our owledge, but in what follows it is possible to explain the various stributions by reference to the configuration of the country, and, indeed, ey might be deduced *à priori*. The whole Russian Empire, in one ntinuous mass, lies between the parallels of 35° and 75° N., and is most evated in the south. Consequently the average temperature of winter ust be low, and indeed in almost all parts of the country it is below e freezing point. All the rivers are ozen and the ground in most parts is vered by snow for several months, the ly exceptions being some districts in the uth. Russia is essentially continental in aracter; the ratio between the extent of coast-line and its area is remarkably all, and the greatest stretch of coast is at which borders the icy Arctic Sea; om west to east there is not a single ele- tion to break the force of the polar nds, on the contrary, great mountain sses ranged along the southern frontier the way against any warm breezes from tropics. Thus the climate of every gion, indeed, of every town in the Russian Empire is more rigorous and re extreme as one goes from west to east, and all are more severe than he regions and towns of western Europe situated in the same latitudes. e diagram of the mean annual temperature for Asia (Fig. 228) shows this rly by the isotherms forming a constant angle with the meridians in ost all places and for all temperatures. The form of the winter herms is most interesting and suggestive from this point of view. e diagram shows how sharply the isotherms of winter bend to the south they approach the interior of the continent. Orenburg, for example, the same temperature as Arkhangelsk, which is 13° further north hough fourteen-fifteenths of the vast solitudes of Siberia are as unknown n the climatic point of view as from any other, yet observations which e been made on the shores of the Lena and the Yana point to the tence of the pole of cold at Verkhoyansk (see Fig. 95), which is quite so near the pole as is Bodö. The isotherms of summer, on

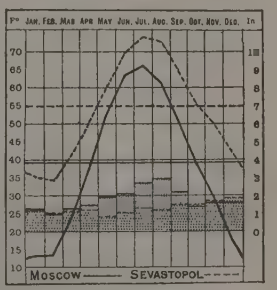


FIG. 211.—*Rainfall and Temperature of Moscow and Sevastopol.*

the contrary, run, on the whole, from west to east, inclining slig towards the north, except on the Pacific coast, where they turn sha southwards; thus in summer Yakutsk has the same temperature as Mos although it is 6° further north. In a similar manner the lines of e atmosphere precipitation and of equal humidity of the air incline tow the south as they run from west to east, the rainfall being least in interior. Atmospheric disturbances propagate themselves with remark rapidity over the almost unbroken plain of the empire; but the preva winds are different in each part of the country. In winter the cold d air accumulates in eastern Siberia in the sort of hollow through which Lena flows; the sky is always clear, the weather calm and still, an some parts of the region snow falls so rarely that it is impossible to sledges during much of the winter. An opposite effect is produce summer; the same part of Siberia over which the barometer indicates greatest pressure in winter has then the lowest pressure found in continent, and thus, speaking generally, it is this part of Russia tha the centre from which the winds blow outwards in all direction winter, and towards which they blow inwards from all direction summer.

Flora.—The climate explains the flora, which in turn renders vis and defines the zones of climate. Along the margin of the Arctic there are great stretches of marshy land, the bare ground of which bears mosses, lichens, and little shrubs so stunted that they are no hig than the grass of a meadow; this is the zone of the *Tundra*. To the so it is bordered by a region of *Low Forests*, in which birch, larch and si fir grow vigorously enough to merit the name of trees. Still further so *Forests* of splendidly grown trees cover almost the whole country; t include birch and conifers of many kinds, and here and there the clear are cultivated. The region of deciduous forests, including the greater of Central Russia, is that in which agriculture is most energetically car on, the crops including rye, flax, and hemp, the principal commoditie Russia. The *Black Earth Region* is a broad zone which extends from valley of the Dnieper to the base of the Urals, and here wheat, fruit tr and rich grass bring prosperity to the country; while south of the bar *Steppes*, the valley bottoms, the margin of the Black Sea, Bessarabia, the Crimea, form a *Southern Zone*, where maize and the vine flour In the Trans-Caucasus, and in the south of the Crimea, where the wi temperature does not fall below the freezing point (Fig. 211), the o ripens and even cotton may be grown.

The boundaries of the various zones of vegetation run on the wh from north-west to south-east; for instance, the northern limit of whea north of 60° N. in Finland, while on the Pacific coast it is south of 50°. glance at the map of summer temperature (Fig. 230) explains how in southern zone it is possible to cultivate certain Algerian vegetables wh only require great heat in summer, while the map of winter temperat

g. 229) explains the absence of fruit trees in the eastern division of the
ne zone. The forests of European Russia occupy 450 million acres;
timber which predominates in the north is pine and fir, mixed with
ch and cedar in the east, and with birch, aspen, and alder in the west.
the centre of Russia the commonest trees are the oak, the maple, the
, and the lime. The area of woodland is diminishing with alarming
idity; in some parts of the country which were densely wooded at the
mmencement of the nineteenth century, only a few trees are now pre-
ved in gardens as a rarity. The destruction of forests increases the
ness of the climate, and the lakes and rivers are beginning to lose more
evaporation than they receive from rain, and some waterways which
re formerly navigable are so no longer.

Fauna.—The fauna of the different parts of Russia is controlled by
land-forms, the climate, and the flora. The Polar bear, the Arctic fox,
ls, and reindeer, such birds as the Polar wild goose, and fish like the
l, salmon, and trout, inhabit the land and waters within the Arctic
cle. The forest region and the Urals shelter the stag, the weasel, fox,
e, bear, and wolf, as well as the lynx and the elk, which are disappear-
; the wild boar only lives in the basin of the Duna, and the beaver is
nd only in the government of Minsk. The birds include the grouse,
tridge, and the hazel hen, while the Salmonidæ and the Coregoni are
racteristic fishes. The country bordering the steppe contains most of
carnivora of the forest belt, and in addition squirrels, foxes, and hares
atly abound, but the most characteristic animals are the *suslik* and the
ak, which ravage the corn-fields. Birds are less numerous than in the
sts. The fish include carp, silures, and sturgeon, and the sterlet of the
ga is justly famed for its caviare. What has been said of the fauna of
opean Russia applies equally to the fauna of Siberia, the Ural mountains
rposing no barrier to the movement of species. The only difference is
the Siberian species are larger in size than those of European Russia,
the fur-yielding animals are very important. In the east and south a
may occasionally be met with, and on the Pamirs the *Ovis Poli*, or
t mountain sheep, is still abundant.

Races.—The nucleus of the Russian population is formed by the
onic branch of the Aryan people, who occupy the most of Russia and
nd in compact masses, speaking different dialects. The north-west
the north are occupied by the Finns. Scattered amongst the Slavs
ibes and families there are many Asiatic races—the Samoyeds,
ns, and Lapps in the north, and the Kirghiz and Kalmuk hordes in the
. The west is occupied by another Aryan race akin to the Slavs, but
distinct, that of the Letto-Lithuanians. The Tatars in the east, and
ews in the south-west, complete the main racial elements of European
a. The Caucasus is occupied by Georgians and other Caucasian
es, Turks, Aryans like the Armenians and Kurds, and Mongol
uk tribes.

Asiatic Russia is the native home of numerous tribes, some scatt and others grouped in compact masses: Samoyeds, Tunguses, Yugag Ostyaks, Voguls, Koryaks, Kamchadales, Turks, Tatars, Mongols, Gily and a host of others.

The Russian Slavs may be distinguished into three distinct gro (1) The *White Russians* occupy the forest-covered plains which ex from the left bank of the Duna to the marshes of the Pripet. (2) *Little Russians* occupy the vast territory between the Donets, the San, the sources of the Tisza. (3) The *Great Russians* inhabit the remainde Russia, especially the centre and the north. Generally speaking the sian Slavs differ in appearance from their brethren of Austria and Balkan States. Mixture has taken place chiefly on the borders of various groups; thus in the north Russians may be met with the features and high ch bones of the Finns, in the south the S have mixed with Mongols, Turks, Tatars.

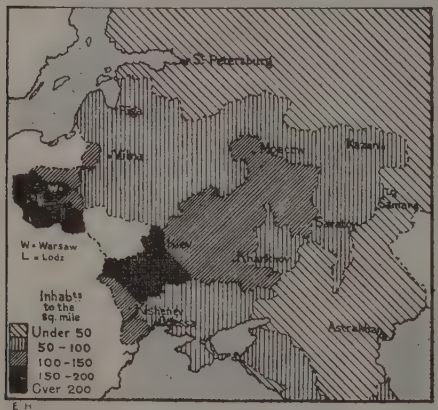


FIG. 212.—*European Russia—density of population.*

At the commencem of written history, a 900 years ago, the vonic people were numerous in the pl of what is now Rus they occupied scarce fifth part of the territ all the rest of the cou belonged to the Li anians, the Finns, the various wanderin settled tribes which had come from the steppes of Asia. At the sent day the change is marvellous; Russians and other Slavs inh four-fifths of the empire, and have spread to its furthest limits Siberia, in Turkestan, and in the Caucasus. Many minglings of div populations have necessarily taken place during those nine centu of Slavonic expansion throughout the territory occupied by the anc inhabitants. The Great Russians are model colonists; the habi migration is hereditary with them, their ancestors migrated into Muscovite forests, and the descendants of these pioneers have gon from clearing to clearing, from steppe to steppe, have climbed the sl of the Caucasus and of the Altai, and, descending the Amur, they h colonised the shores of the Pacific.

Population.—According to the first and only census of the Rus Empire, which took place on February 7, 1897, the population numb

o million inhabitants. This figure is exceeded only by the British mpire and China. The distribution of population is very unequal, as e accompanying map of the population of European Russia clearly ows (Fig. 212). While some Russian governments have as many as o inhabitants to the square mile (Petrokow in Poland) others have not so uch as one inhabitant for four square miles, as in e coast province of Siberia.

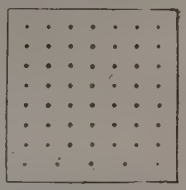
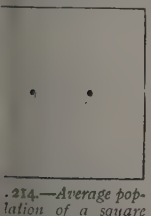


FIG. 213.—*Average population of a square mile of European Russia.*

Agriculture.—Agriculture occupies nine-tenths the population, and 900 million acres, forming about o-thirds of the whole territory, is cultivable land, which 225 million acres consist of the celebrated *ernoziom*, or black earth, stretching from the Ural the western frontier of the empire; but on account the slight density of the population only about 240 llion acres are actually cultivated. The chief place ongst the products of the soil is taken by cereals, d then follow flax, hemp, potatoes, beetroot, and tobacco; in the southern ne, especially in the Crimea, fruit trees are largely grown, and the vine cultivated as far north as the 48th parallel.

The rearing of cattle acquires considerable importance, especially the grassy steppe land. Sheep are most numerous amongst the e stock, followed in order by horned cattle, horses, camels, buffaloes, ats and pigs. The fisheries are very productive, especially in the lga, the Ural, and the Siberian rivers. Hunting and the collection of s is the exclusive occupation of the native tribes in the Siberian itudes.

Mines.—Mining is carried on most extensively in the Urals, the Altai, d the Sayan mountains, and in Transbaikalia. The most important nerals produced are, in the order of their value, gold, silver, copper n, salt, coal (in the basin of the Donets and the Oka), and petroleum at Baku, Kerch, and Taman. Platinum, lead, tin, and zinc are found in smaller quantities; some precious stones occur in the Urals and Transbaikalia, and marble is quarried in Finland and the Crimea.



. 214.—*Average population of a square mile of Siberia.*

Industries.—Not very long ago all manufactured goods were imported into Russia from abroad, or were made locally on a small scale, but during the last few decades Russia has been making itself more and more independent of foreign manufactures. There are now as many as 100,000 factories and workshops of all ds, most of them being situated in the great centres of population, ecially St. Petersburg and Moscow, in Poland, and in the mining :ricts; but six-sevenths of the industrial population work in their 1 houses (*Kustari*). The first place amongst the industries belongs the distilleries and breweries; cotton factories and sugar refineries

come next, and then follow flour mills, brick works, woollen facto
iron works, tobacco manufactories, and textile mills for linen and hemp

Trade.—The internal commerce of Russia is considerably develo
the number of merchants being more than 80,000. Much of the trad
still carried on in great fairs, to which people come from far and n
they are held in many of the towns in European Russia, the most c
brated being that of Nizhnii-Novgorod. The navigable rivers of Ru
are not very extensive compared with the size of the country. Europ
Russia does not contain more than 22,000 miles of navigable waterway
one mile for every 90 square miles of area. Since all the rivers are fro
during the cold of winter, and much reduced in depth by the drynes
summer, navigation upon them is in many cases confined to the perio
the spring floods. The one advantage which the rivers of Russia pre
from a commercial point of view is their divergence from neighb
ing sources, which facilitates transport from one to another, and
construction of canals. The Russian canals are of much commercial imp
tance; the grea
of these, as rega
the traffic carried
by it, is the sys
which unites
Caspian and the
tic by the Volga
Neva, the Ma
canal, those of T
vin, and of Vysh
Volochek.
canals uniting
Black Sea with

FIG. 215.—*The Resources of the Russian Empire.*

Baltic by the Dnieper on the one side, and the Duna, the Nieman
the Vistula on the other, are less important, being only available for bar
Considering the area of the country, the railway system is not as yet v
extensive, though growing steadily. The cart roads are generally v
bad, especially in spring and autumn. Winter is the best season
the transport of goods, for then the whole plain of Russia, with its riv
lakes, and marshes, is covered with a uniform pavement of snow,
sledging is universal. Foreign trade by land is carried on with west
Europe, and with the various countries of Asia on the east and so
The most important trading towns near the western frontier are
ancient Kiyev (Kieff), on the Dnieper, Warsaw, the old capital of Pol
on the Vistula, and Vilna. On the Asiatic side the most important cen
are Orenburg, Troitsk, Petropavlovsk, Semipalatinsk, and Kyakhta.

Seaboard and Shipping.—The Russian Empire has 280 sq
miles of area for every mile of coast, and this comparative isolation fr
the sea is increased practically by the fact that the Arctic coast is alm

ways and everywhere closed by ice ; the seas of Bering, Okhotsk, and of pan, although free for several months of the year, border an uninhabited untry far removed from all the great centres of population ; near these ntres the White Sea is only navigable during three months of the year. ne Baltic is a dangerous sea, and for five months the greater part of the ast is blocked by ice ; recent attempts to keep the harbours open by the e of ice-breaking steamers have to some extent mitigated this disadvan-ge. Finally, the Caspian is enclosed by land, affording no outlet to the ean. The Black Sea and the Sea of Azov alone are nearly always ice-free, t the former, though deep and safe for shipping, has few harbours, and the tter is too shallow to be useful ; moreover they are both separated from e ocean by a series of straits commanded by foreign countries. These cts explain the long struggle of Russia to gain a footing on the Baltic, nich was accomplished under Peter the Great, and the recent tendency to pansion towards Constantinople and the Mediterranean on the one hand, d towards the Yellow Sea on the other, where Port Arthur and Dalni 'a-lien-wan) were held for a time. The nature of its coasts explains why ussia possesses few great seaports. The most important on the Baltic are . Petersburg with Cronstadt, Narva, Revel, Riga, Windau and Libau; on e Black Sea, Odessa, Nikolayev, Kherson, Eupatoria, Theodosia, Kerch, erdyansk, Taganrog, Mariupol, Rostov on the Don, Yeisk and Poti ; on the rctic coast, Arkhangelsk and Alexandrovsk ; on the Caspian, Astrakhan, erbent and Baku, and on the eastern coast the Pacific ports, Vladivostok, ort Arthur, and Dalni.

Government.—The Russian Empire was an absolute autocratic onarchy, in which the Emperor or Tsar was the temporal chief of all his bjects. He made the laws, declared war and concluded peace in his own me, and on his own responsibility. The only dignitaries who took part the legislative powers of the emperor were the eleven Ministers, the Coun- of State, the Senate, and the Holy Synod. The *Council of State* ought principle to take cognisance of all laws and of all important measures fore they are submitted to the sovereign, but it had no right of initiative the preparation of new laws. The "*Directing Senate*" created by Peter Great was charged with the registration and publication of the imperial ases, and it also served as the supreme court of appeal in judicial matters. e *Holy Synod*, also instituted by Peter the Great, is presided over by Metropolitan of St. Petersburg and Novgorod, and is composed of a tain number of prelates, while a lay procurator, nominated by the mperor, represents the wishes of the sovereign. In 1905 an elective liament called the *Duma* was convened by the Emperor, who however ains his personal power and legislative initiative. In 1864 the statute territorial institutions had been promulgated, which recognised the elec- principle in the conduct of business for each government and for h district. These local institutions bear the name of *Zemstov*, and are mposed of representatives drawn from all classes of society—nobles,

citizens, traders, and peasants. The President of the Zemstvo is alm always the marshal of the nobility, and the sittings are very short. T governor of the province has the right of suspending any decision of Zemstvo which he considers to be contrary to the laws or to the w being of the State. The municipal institutions are analogous to Zemstvo. The grand-duchy of Finland has preserved some remains of ancient constitution in a national parliament, consisting of four estates— nobles, the clergy, the burghers, and the peasants. The Central Asia State Bokhara has still nominally its own sovereign, but from 1873 it been practically a Russian dependency. The khanate of Khiva has a been under Russian supremacy since 1872.

Administration of Justice.—The organisation of justice, est lished in 1864, is justly considered as one of the greatest reforms of Tsar Alexander II. As yet the Russian courts, and especially the juri have shown that clemency which is one of the most conspicuous traits the national character, and have not aspired to the ideal of implacal severity which prevails in other countries. In principle the judic power is independent of the administrative ; trials are public, and seric cases have to be submitted to assize courts with a jury. In reality, ho ever, several offences such as bigamy, resistance to local authorities, a malversation of public money, are reserved from the privilege of trial jury ; political crimes, which consist in the spreading of more or l advanced ideas, fall under the jurisdiction of special courts, and for so years even this semblance of a fair trial has been set aside by a priva process of the administrative authority which banishes the delinquents the suspects to the north of Russia, or even to Siberia, for periods whi may extend to as much as ten years. Since 1864 Justices of the Peace h been elected by representatives of the Zemstvos, but these were chang in 1889 for "chiefs of the district" (*Uyezdnyi nachalnik*) in the country, a "town magistrates" (*Gorodskoi sudia*) in the towns ; both being nominat by the administration.

Books, magazines, which are very numerous in Russia, and newspape when containing objectionable matter are not, as in all other countri made the subject of investigation in the courts, but are judged private by the Government ; a committee of Ministers has, since 1872, exercis a censorship without appeal on all literary works, and interdicted confiscated those which they considered it undesirable to place befo the public. Newspapers are subject to the special disability of bei only supplied to subscribers, the sale of single numbers being prohibited

Education.—There are in Russia nine universities and 42 speci colleges. Secondary instruction is given in the Gymnasia and oth schools under the charge of the Ministry of Education, as well as in t Cadets' College, which is under the Ministry of War. These institutio number in all 900. Elementary education is much neglected ; in Europe Russia there are about 65,000 schools, with rather more than 3 milli

pils of both sexes, a proportion of one pupil for 34 inhabitants; in e Caucasus there is one pupil for every 50 inhabitants, and in Siberia smaller ratio. The expenditure upon education in 1896 was about ,600,000, or £1 for 50 inhabitants. In contrast, it may be noted that in e United Kingdom, with one-third of the population of the Russian mpire, the schools are attended by 5,400,000 pils, or one for every seven inhabitants, and the vernment expenditure on primary education is ,000,000, or more than £1 for every five in- bitants.

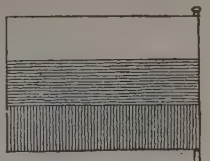


FIG. 216.—*The Russian Flag.*

Army and Navy.—Military service is uni- rsal and compulsory; the period of service in e regular army is five years for the illiterate, but ductions are made in proportion to the degree of education of the con- ripts. The effective strength of the army on a peace footing is about ,000 officers, and more than 1,000,000 men. In case of war Russia can ace in the field upwards of 4½ millions of men, and more than half a llion horses. The most important fortresses in European Russia are arsaw, Ivangorod, Novo-Georgievsk, and Brest-Litovsk, forming what s been termed the Polish Quadrilateral; Vilna, Ust Dvinsk (which fends Riga), Dvinsk (formerly called Dunaburg), and Vitebsk, between e Polish frontier and the Duna; Bendery and Akkerman, which defend uth-western Russia. In the Caucasus Alexandropol, Kars, and other towns are strongly fortified, and in Asia Samar- cand, Tashkent, and Vladivostok may be men- tioned, but there are many smaller forts at different points on the frontier.

IG. 217.—*The Russian Naval Ensign.*

In the navy the period of active service is seven years. The Russian fleet in Europe and Asia contains 250 vessels with 38,000 men, and its annual cost is about one-fifth that of the army. The chief fortified seaports are Sveaborg in Fin- nd, Cronstadt and Ust Dvinsk on the Baltic, Sevastopol and Nikolayev the Black Sea, Vladivostok and Port Arthur (on Manchurian territory ased from China) in Asia.

IV.—TOWNS

The Towns of Russia.—With a few exceptions the towns of Russia e hardly more than villages; the houses are usually of wood or brick, d the streets are ill-paved when they are paved at all. In rainy weather e foot passengers have to wade through the mud, and in the drought of mmer they are half blinded with driving dust. The towns contain few no buildings of any interest. In 1897 there were in the Russian Empire enty towns with a population exceeding 100,000, but in addition to

hese several of the smaller towns deserve to be mentioned on accoun specially interesting circumstances.

St. Petersburg.—*St. Petersburg*, the modern capital of Russia, ra fifth by population amongst the great towns of Europe. It occupies large and many small islands at the mouth of the Neva, but its true ce is now on the left bank of the Great Neva, south of the islet on wh Peter the Great founded his new capital two centuries ago. Here st the Winter Palace, the Admiralty, the Cathedrals of St. Isaac and Ka the equestrian statue of Peter the Great, based upon the heaviest mas rock that has ever been transported by human agency, and the colum Alexander, a granite monolith 75 feet in height. The part of the t which was first built contains the Fortress of Peter and Paul, where many prisoners of State have been confined, and the church in which Emperors are buried. On Vassili Ostrov (Basil Island), the Univer

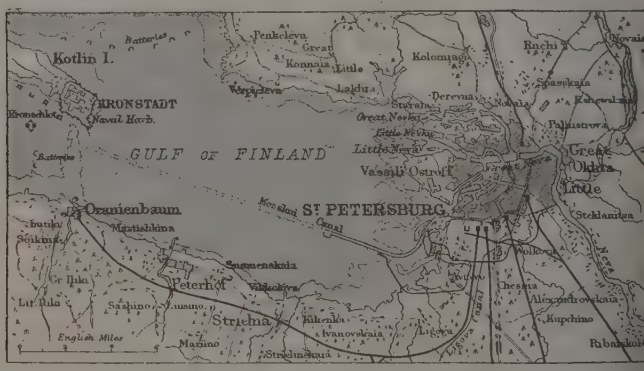


FIG. 218.—*St. Petersburg and surroundings.*

the Academy of Sciences, the Exchange; in the quarter of Viborg, School of Medicine, and the Artillery College are situated. The str of St. Petersburg are wide and regular with lofty houses of five or stories, but there are few public gardens and no thoroughfares plan with trees. The climate is unhealthy, and the mortality exceeds birth rate so that the population is only maintained by the immigra of people from all parts of the empire, and even from abroad. Altho St. Petersburg is essentially a town of soldiers and government cials (*Chinovniks*) it has also considerable industrial importance: s large establishments, belonging to the State, manufacture tapestry, g and china, but the main industrial activity is found in the factories private firms. The commercial movement of St. Petersburg by amounts to a quarter or even a half of the total trade of Russia, but u of the traffic in the ports of the capital is carried on by foreign ves the British, German and Norwegian flags are more common amo

merchant shipping than the Russian, and indeed many of the sels sailing under this flag belong to Finnish owners. Education every grade, from the University downwards, is more developed than in y other town in Russia, and in all matters concerning literature, science l art, St. Petersburg leads the empire. The Public Library ranks next the British Museum Library in London and the National Library in ris. The museums are amongst the finest on the continent. The most portant is the Hermitage, which contains a great number of pictures by most famous European painters, and a unique selection of the works of ssian artists, little known in western Europe; but the glory of the seum is the collection of ancient Greek remains of the best period of llenic art and the Scythian antiquities from the Tauride and the south Russia. A city of sumptuous palaces St. Petersburg completes the endour of its state by a ring of parks, royal residences and pleasure orts at *Peterhof*, *Oranienbaum* and *Pavlovsk*. The village of *Pulkovo*, ut twelve miles south of the capital, is the site of the national observa- y which sets the meridian for Russia. It is approximately 30° 20′ east that of Greenwich. Twenty miles to the west of St. Petersburg the werfully fortified naval port of *Cronstadt*, on an island, forms the centre the chain of impregnable fortifications which protects the mouth of the va.

North-Western and Northern Towns.—*Riga* is situated at the head the Gulf of Riga on the Baltic, at the mouth of the great navigable Duna, a er whose sources rise close to those of the Volga and Dnieper. The har- ır is the third in the Russian Empire in order of trade, but its prosperity ıampered by the length of the winter, during which all traffic is stopped ice for several months. More than one third of the trade of Riga is h Great Britain, which sends salt, coal, tobacco, spirits, colonial com- dities and manufactured goods, and receives in exchange hemp, flax, in, tallow and timber. The old Hanseatic town still presents a di eval appearance in its central parts, where some interesting buildings e survived, including the palace of the old Teutonic Knights and the ld halls; but all round beyond the boulevards modern suburbs extend ı wide and straight streets. The Polytechnic School is the principal cational establishment. The river is crossed by a viaduct nearly half ile in length, and all approaches are protected by fortifications.

Vilna, the ancient capital of Lithuania, on a tributary of the Niemen, tains an ancient cathedral founded by Yagello, and historic castles ch have been in ruins since the Muscovite occupation. Vilna was one ıe centres of culture in White Russia, and the first printing office in the ire which employed the Cyrillic character was founded here in 1525. historial museum is one of the most remarkable in Russia, and there so a Geographical Society.

rkhangelsk (Archangel) was founded at the mouth of the Northern ıa on the White Sea in the twelfth century, but only became important

when the English navigators seeking the North-East Passage arrived t
by chance in the sixteenth century, when it was the only Russian sea
During the few months when the sea is free from ice Arkhangelsk exp
flax, hemp, oats and other grain, timber, tar, tallow and fish oil. A co
of English workmen is established in the neighbourhood of the t
taking charge of the great saw-mills. The railway recently extende
Arkhangelsk from Moscow makes it the most northerly terminus in Ru

Yekaterininsk, newly founded on the Murman coast, at the mouth o
river Kola, is an ice-free port which will be of value when placed in
munication with the railway system.

Towns of Finland.—*Helsingfors*, the capital of the Grand Duch
Finland, is a well-built European town laid out with parks and promen
and possessing the most northerly botanic garden in the world.
university is a centre of scientific activity, and the library conta
valuable collection of documents bearing on Finland and its history.
an active seaport, trading particularly with England. The formid
defensive works of *Sveaborg*, on the rocks of the Seven Islands, comm
the channel leading to Helsingfors and protect the town from attac
the seaward side.

Abo, the most ancient city in Finland, is a centre for the maritime t
of the gulfs of Bothnia and Finland. It is the second town of the g
duchy in population, and third in trade, the staples of the port being ti
and grain. The astronomer Argelander compiled his famous star-catal
at Abo. *Viborg* is the most frequented harbour of Finland, and s
second in the value of its trade, on account of its favourable position, b
near St. Petersburg and a terminus of railways and canals leading t
interior. Large vessels cannot reach the port, but discharge and loa
Trångsund, a strongly fortified roadstead eight miles further south.
chief export is timber.

Towns of Poland.—*Warsaw* (*Warszawa* in Polish), situated on a
navigable river in the centre of a fertile plain, is the point of converg
of commercial routes from all parts of Russia and western Europe, a
destined one day to become one of the greatest cities in Europe.
ancient palace of the kings of Poland, surrounded by terraced gar
rising immediately on the bank of the river, is the most remarkable o
public buildings, and contains a library and collection of works o
From it diverge the principal avenues lined with hotels and public b
ings. The old town with narrow streets extends towards the north,
the newer quarters with their wide avenues are situated towards
south. A railway viaduct and a seven-arched bridge across the ye
waters of the Vistula unite the city to the suburb of *Praga*. There
university, founded in 1816, but closed after the insurrection of 18
until it was re-opened in 1861. It does not enjoy all the rights whic
other Russian universities possess, and the teaching must be given en
in the Russian language. Warsaw also possesses a School of Arts

stries and a musical Conservatoire. The capital of Poland is nguished by remarkable industrial and commercial activity.

odz, which was only a poor village of less than 800 inhabitants in 1821, w the second city in Poland by population as well as by industry. It t an ordinary town ; it consists of one street about six miles in length ach side of which there are hundreds of factories where seven-eighths the cotton goods manufactured in Poland are produced. *Czestochowa* a celebrated convent is, next to Kiyev, the most frequented place of image in the Slavonic world, and it is also a busy market town, doing ge trade in cattle and in cloth. The convent perched on the summit hill looks like a fortress, and was indeed one of the chief castles of nd in former days. *Lublin* is the second Polish town in size, if the agglomeration of population in the straggling villages of Lodz is not idered. It became famous by the stormy meeting of the Diet of 1568, h decreed the incorporation of Lithuania with Poland.

Moscow.—The great city of *Moscow* is situated almost in the geome- centre of European ia, and thus forms a s where roads and rail- from all parts of the try converge. In its r outlines the plan of cow resembles that of , the same winding and the same circular levards appear ; but the Seine is large gh to make Paris the ipal port of France, Moskva which traverses the ancient capital of Russia is only navigable nall vessels. The centre of the town is the Kremlin or fortress situ- on the left bank of the Moskva, and constituting a picturesque pile of drals, monasteries, palaces and barracks. There rises the tower of the Great, 266 feet high, and an object of veneration, almost of worship people. Some of the buildings of the royal palace are remarkable in architecture, recalling in turn the palaces of Venice and those of and presenting a confused congeries of domes, turrets and colon- painted vividly in green and red and yellow. Besides the Kremlin is another fortified enclosure, that of *Kitaigorod*, the commercial city ning many remarkable buildings, including the famous church of the Blessed (*Vassili-Blazhennyi*) ornamented with tiles and variegated s, the details of its architecture purely Byzantine, but entirely vite in its general appearance. Since 1755 Moscow has been the f the most frequented university in Russia, which has exercised erable influence on all philosophical and literary movements in the

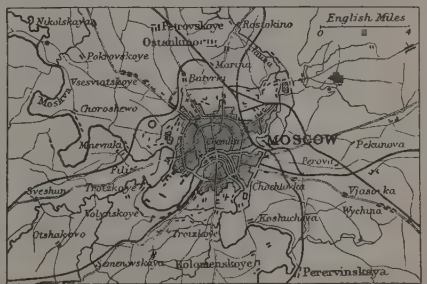


FIG. 219.—*Moscow.*

empire, especially between 1830 and 1848. Moscow is a great centre publishing, and the books and prints produced there are carried to most remote provinces of Russia to be sold or exchanged for the produ of the country. It is one of the chief industrial centres, the manufactu of the government of Moscow amounting to one-fifth of the whole p duction of the empire.

Tula is the chief station on the railway between Moscow a Kharkov, in the centre of a manufacturing district. Several thousa workmen are employed in the manufacture of arms in one factory wh produces 70,000 rifles as well as swords and instruments of iron and st Tula is great in making cutlery, mathematical instruments, machinery a metal work of every kind ; no less than 200,000 of the samovars, of wh every Russian family possesses one, are turned out each year.

Towns of the Volga Basin.—*Nizhnii-Novgorod*, a town of 100, inhabitants, is one of the most important in Russia on account of great annual fair, which is not only the most frequented in the emp but in the world. The town stands 320 feet above the river at the c fluence of the Oka. *Kazan* is first mentioned in the Russian Annals the year 1376. The town having been removed in the fifteenth cent more than three miles back, is no longer situated on the left bank of Volga, except during floods, when the great river spreads over the pl and reaches the base of the little hill on which Kazan stands. All houses are modern with the exception of the ancient red brick tower Sumbek. Kazan contains a university and a Tatar printing establishme which produces a great number of books, as well as an ecclesiastical coll dating from 1646. It is also an important commercial town, half of inhabitants being engaged in manufactures and trade. *Saratov* is largest city of the lower Volga, possessing factories of every kind a forming the centre of trade for the German colonies established along river. There is considerable river navigation, which has increased in amo since the establishment of direct railway communication with Mosc The ancient town of *Astrakhan* occupies the site of Atel or Itil, one the capitals of the kingdom of the Khazars. The minarets of the mosq rise here and there amongst the spires and gilded bulbs of the church and with the numerous canals crowded with the shipping of the Volga a the Caspian give an air of variety very unusual in Russian towns.

Perm is situated in the middle of a great mining region almost at confluence of two great fluvial waterways, the Kama and Chusovaya. is an important place for trade between European Russia and Sibe especially since the construction of a railway across the Urals to Tyum This line passes through *Yeketerinburg*, the residence of the Direct General of the Ural mines, where there are assay offices, gold smelti furnaces, and establishments for cutting the precious stones found in neighbourhood.

Towns on the Dnieper.—*Kiyev* (Kieff), the "Holy Town," w

ined from the first by its position to be one of the centres of gravity Russian history. It is situated almost in the centre of the basin of Dnieper, below the confluence of all the upper tributaries, where the n stream concentrates in one channel their collective waters and e. Kiyev stands on a terrace from 300 to 400 feet above the l of the river; the houses are ranged along the stream, but at some ance from the water, for a length of six miles. Some of the avenues as wide as squares; masses of poplars growing here and there the slopes contrast their greenery with the glitter of the gilded olas. The Church of St. Andrew, the Cathedral of St. Sophia and Monastery of Pechersk, the holiest place in all Russia, are the most ous of the many religious edifices in the town. The university s third amongst those of Russia; there is also an ecclesiastical ege which attracts students from all Slavonic countries, and a polynic institute. Two great bridges cross the Dnieper below the town. *rson*, near the mouth of the Dnieper, is the capital of the government ch bears the same name and is an active business town, less important Odessa or Nicolayev, but yet exporting large quantities of wood, als and hides. *Nicolayev* may almost be considered as a town of the eper estuary, although situated at the junction of the Bug and Ingul. the chief naval station on the Black Sea, and is equipped with extendockyards, machine-shops and provisioning depôts, which employ sands of workmen. There are strong fortifications, and a great ing dock anchored in the Bug can receive the largest battleships. rt from its pre-eminence as a naval port the harbour is acquiring a iderable amount of export trade, and the town is growing rapidly. *terinoslav*, a new town, has acquired importance during the nineth century on account of its position at the great bend of the eper above the rapids, where the river is crossed by a bridge more three-quarters of a mile in length.

Other South Russian Towns.—*Odessa* is the most important ort of the Black Sea, affording safe anchorage for ships. Being a of recent formation it has, next to St. Petersburg, the most European ct of all the towns of Russia. It presents a beautiful appearance from ea, as it is situated on the highest part of the terrace of the steppe. dsome houses line a promenade on the edge of the cliff whence a umental stairway leads down to the quays and the harbour. In the ral part of the town the houses, built in the Italian style, are laid in wide and handsome streets. The university of Odessa is one of mallest in Russia. The population is extremely mixed, the principal hants being Jews, Italians, Greeks, Germans and Frenchmen. *Kharkov*, h was a simple village in the middle of the seventeenth century, grown, thanks to its position intermediate between the Dnieper the Don, and between Kiyev and Taganrog. The fairs held in kov are amongst the most active in Russia, and the commerce and

industry of the town is well developed. It is also an intellectual c of some importance, having a flourishing university, founded in *Rostov*, on the Don, is a great commercial town where nearly coasting vessels come each year laden with cereals, flax, wool, tallow other commodities. It is the gathering place of the harvesters, haym and vine-dressers who assemble to offer their services to the proprieto the surrounding country ; but the town has no other claim to considera *Kishinev* is a large village in Bessarabia, with wide streets thick mud or smothered in dust, according to the season, and serving as a m for the grain and live stock of the surrounding agricultural country.

Orenburg, formerly a fortress, is important from the strategic poi view, for it is situated on the right bank of the Ural river which sepa Russia from the Kirghiz steppe, and inhabited by nomads who were bulent and semi-independent some fifty years ago. It has lately bec an important town, and the industrial population has steadily incre during recent years, while a railway is being built to Tashkent.

Sevastopol is a fortress celebrated for its great siege by the allied ar in 1854, and now it mingles ruins of modern date with those of antiquity extending back to the times of the Scythians and the Gr Ruined by the disasters of the Crimean war, the population of Sevast was reduced to 6,000 in 1865 ; but the construction of a railway w attaches it to the continental system, and its situation on a fine bay restored the town to prosperity. Stores for grain have been built in neighbourhood of the port, a monumental railway station takes the p of an old redoubt, and the famous hill of the Malakhov has been conve into promenades. The port has recently been reserved for Russian n vessels.

Caucasian Towns.—*Tiflis* stands on the two banks of the Kura valley floor surrounded by grey heights, rising to 1,200 and 1,500 feet ab its level. The town is divided into two parts, an Asiatic quarter wh recalls Constantinople, and the new town which has sprung up since Russian conquest, and contains fine shops and all the equipment European city. One-third of the inhabitants of Tiflis are Armenians ; Russians only compose one-fifth of the population. There are no buildi of special interest, but a valuable Natural History Museum. T contains several scientific societies ; its Geographical Society has publis many standard works on the geography and ethnography of the Cauca *Baku*, an ill-built, irregular dusty town of Asiatic appearance, is an ac seaport on the Caspian. A railway connects it with *Poti* and *Batum* the Black Sea, and another line has been opened to *Derbent*, which un it to the railway system of European Russia. All the inhabitants of neighbourhood are occupied in refining petroleum and preparing bitum

Towns of the Trans-Caspian Railway.—The railway ac the Trans-Caspian district of Turkestan is of immense strategic value, it can throw a great body of troops with extreme rapidity against

nan or Indian frontier. The line was commenced in 1884 and now nds to Tashkent on one side and to Kushk in the vicinity of Herat in her. The chief towns through which the railway runs are *Askhabad*, administrative capital of the Trans-Caspian province; *Merv*, which utes with Balkh the title of the "Mother City of Asia," once a centre cience; and *Bokhara* which, under Russian protection, only since 1873, es in the history of human thought. Bokhara, formerly a town of poets, rs, and illustrious men of science, now retains only the dead shell of ld intellectual life. Routine Moslem instruction is still given in more a hundred "madrassees" (schools), but the science has vanished. re are still, however, some interesting industries, including the manu- ure of fine cotton fabrics, ornamental leather and silk. From a com- cial point of view the capital of the Emirate of Bokhara has always n great as the meeting-place of merchants from the markets of Russia, a, Afghanistan, Persia, and China. *Samarcand* was in ancient days an trious city in the development of human knowledge, and also one of

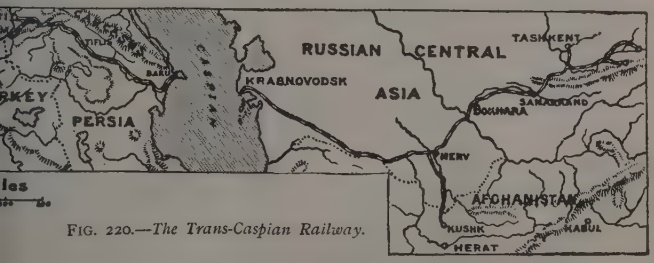


FIG. 220.—*The Trans-Caspian Railway.*

largest towns of Asia. When besieged by Jenghiz Khan it was garrisoned n army of 100,000 men. Subsequently it was Timur's capital, but most ne palaces and mosques of that period are now in ruins. A few scattered s remain, here a piece of wall, there a tower or a cupola; the mosque aining Timur's tomb in particular is surmounted by a cupola of rare ty. A still finer mosque is that of Shah Zindeh, the most splendid in all ral Asia. The Russian quarter of Samarcand has regular streets, gardens, wooded avenues, contrasting with the irregular plan and ruined archi- ure of the native city. *Tashkent* is scattered over a space about eight s long and five wide. The houses, most of which are low, are hidden he verdure of poplars, willows, and other trees which border the ation canals. The Russian quarter, in spite of the recent occupation, ready of importance, and consists of one-storied houses built of sun- d bricks, the roofs made of willow branches and reeds covered with a of clay and turf. The chief industries are the weaving of silk stuffs the tanning of leather. There is an astronomical observatory and a graphical society in the town. *Kokan*, which in 1870 was the capital n independent State of the same name, is a modern city for this part of

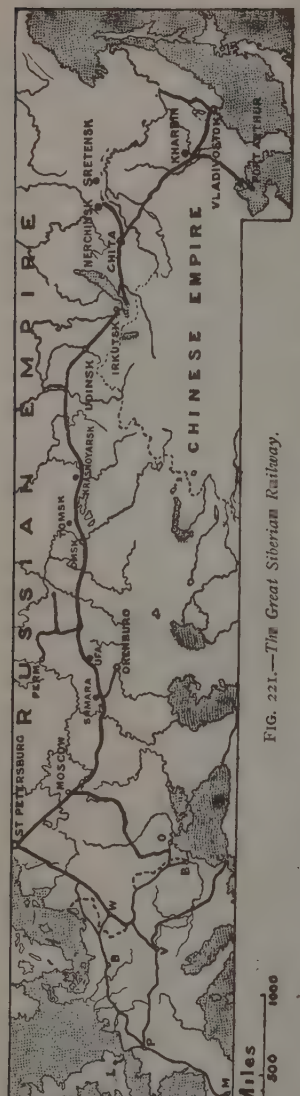


FIG. 221.—*The Great Siberian Railway.*

the world, with fairly wide and r streets, large gardens, and the equipped bazár in Russian Turkest

Khiva.—The capital of the Kh of Khiva is only an agglomeration o hovels through which wind narrow of deep mud or thick dust accordi the season. Before the Russian expe of 1873 it was one of the chief markets in Asia, but the industry trade of town and State are now of importance.

Towns on the Great Sibe Railway.—Although the Russian E is far behind other European States extent of its railways when compared the area of the country, it actually pos the greatest length of railway lines the United States. From Alexandro the German frontier, the iron way without a break to the northern sh Lake Baikal, and on from the sou shore to Vladivostok and Port A on the Pacific, a distance of 5,000 as the crow flies. The great ra across Siberia has a very high i tance, not only for Russia but fo whole world, since it places we Europe in direct and rapid communi with China and Japan. The line mences at Samara on the Volga, and p through *Ufa* on the Belaya and *Zl* situated in a smiling valley of the U town of metallurgical works and r factories of small-arms, especially and sporting guns. *Omsk*, farther on the Irtysh, is an important centr Western Siberia in the midst of the ste but *Tomsk*, which possesses the one versity of Siberia, is left on one side o railway, and the line goes on th *Krasnoyarsk* on the Yenisei, the chief of the government of Yeniseisk an commercial centre of the neighbo valleys rich in mines. *Irkutsk*, a to

de and straight streets, was founded on the right bank of the Angara, ar its exit from Lake Baikal, in 1669. It possesses the oldest building in beria, a fort inscribed with the date 1661. It is not only an industrial ntre, but a focus of intellectual life as well. The Geographical Society blishes important works on Russian Asia and the neighbouring untries. Farther east, beyond Lake Baikal, the line passes *Chita*, the pital of Transbaikalia. A branch of the great railway follows the Amur lley to *Nerchinsk*, the chief trading centre of a great mining region ere silver-lead, mercury, copper and iron are worked ; and to *Sretensk*. om Chita the great Siberian railway runs south-eastward through Manuria to *Kharbin*, a new Russian city, and thence one branch goes to adivostok, and another to Port Arthur and Peking.

Vladivostok is situated on the only sea freely open for almost all the ar, which bathes the shores of the Russian Empire. With the increase agricultural population and the stimulus of its approaching position as ailway terminus, Vladivostok promised to become the Constantinople of e East as its founders hoped when they established it in 1860, the name ey gave meaning Rule the East. Though the population of the town s grown to nearly 30,000 its future prospects were compromised by the se of the leased harbours of Port Arthur and Dalni, but the loss of these 1905 as a result of the war with Japan restores its earlier importance.

FIG. 222.—*Railways of European Russia.*

STATISTICS OF THE RUSSIAN EMPIRE.

Great Political Divisions.	Area in sq. miles.	Population in 1897.	Density of Population per sq
European Russia	1,902,202	94,215,415	5
Poland	49,159	9,455,943	19
Finland	144,255	2,527,801	1
Caucasia	180,843	9,248,695	5
Siberia	4,833,496	5,727,090	
Steppes	908,073	5,451,385	
Turkestan	471,371	4,270,299	
Total	8,489,399	130,896,628	1

	Area in sq. miles.	Population
Largest administrative division, Yakutsk	1,533,400	261,53
Most populous „ „ Kiyev	19,690	3,576,12

POPULATION OF CHIEF TOWNS IN 1897.

St. Petersburg and suburbs	1,267,023	Yaroslav	70,61
Moscow and suburbs	1,035,664	Orel	69,85
Warsaw	638,208	Kherson	69,21
Odessa	405,041	Vitebsk	66,14
Lodz	315,209	Yekaterinodar	65,69
Riga	256,197	Zhitomir	65,45
Kiyev	247,432	Revel	64,57
Kharkov	174,846	Libau	64,50
Tiflis	160,645	Belostok	63,92
Vilna	159,568	Namangan	61,90
Tashkent	156,414	Penza	61,85
Saratov	137,109	Yelisavetgrad	61,84
Kazan	131,508	Cronstadt	59,53
Yekaterinoslav	121,216	Kremenchug	58,04
Rostov-on-the-Don	119,889	Tsaritsyn	55,96
Astrakhan	113,001	Yekaterinburg	55,48
Baku	112,253	Samarcand	54,90
Tula	111,048	Ivanovó-Voznesensk	53,94
Kishinev	108,796	Berdichev	53,72
Nizhnii-Novgorod	95,124	Tver	53,47
Nikolayev	92,060	Poltava	53,06
Samara	91,672	Kursk	52,89
Minsk	91,494	Tomsk	52,00
Voronezh	84,146	Novocherkask	52,00
Kokan	82,054	Taganrog	51,96
Kovno	73,543	Irkutsk	51,43
Orenburg	72,740	Sevastopol	50,71
Dvinsk (Dunaburg)	72,231	Lublin	50,15

MEANS OF TRANSPORT IN 1896.

	European Russia.[1] Miles.	Asiatic Russia. Miles.	Total Miles
Railways	29,300	5,300[2]	34,60
Waterways (total)	48,000	52,000	100,75
„ nav. for steamers	17,000	30,000	47,00

SHIPPING TRADE OF CHIEF PORTS

(in million tons of merchandise).

Port.	Foreign Trade. Imports.	Exports.	Total.	Coasting Trade
Odessa	0·35	2·60	2·95	1
St. Petersburg and Cronstadt	1·93	1·02	2·95	0
Riga	0·44	1·13	1·57	0
Nikolayev	0·02	1·36	1·38	0
Libau	0·20	0·80	1·00	0
Batum	0·09	0·81	0·90	0
Rostov	0·01	0·74	0·75	0
Sevastopol	0·01	0·52	0·53	0
Novorossiisk	0·01	0·50	0·51	0
Taganrog	0·02	0·45	0·47	0

[1] Including Finland.

[2] To this should be added 1,600 miles of the Siberian railway in Chinese territory.

ANNUAL TRADE OF RUSSIAN EMPIRE

(in millions of rubles).

	1885-89.	1890-94.	1895.	1896.
Exports	634·8	628·6	689·1	668·7
Imports	415·9	436·2	526·1	540·2
Difference	218·9	192·4	163·0	128·5

ANNUAL TRADE OF RUSSIA

(in pounds sterling, approximate).[1]

	1871-75.	1881-85.	1891-95.
Imports	52,000,000	55,000,000	46,900,000
Exports	60,000,000	58,000,000	62,800,000

PERCENTAGE COMPOSITION OF SPECIAL EXPORTS.

	1885-89.	1890-94.	1895.	1896.
Food Products	60·2	57·0	56·8	55·6
Raw Materials	34·6	37·7	37·8	37·4
Animals	2·1	2·2	2·3	2·2
Manufactures	3·1	3·1	3·1	1·9

RUSSIAN TRADE WITH OTHER COUNTRIES

(in millions of rubles. 1896).[2]

Countries.	Exports.	Imports.	Total Trade.
uintries.			
nany	184·0	190·2	374·2
ed Kingdom ..	160·9	111·3	272·2
ce	58·2	23·4	81·6
erlands	70·8	5·8	76·6
ed States ..	1·6	65·7	67·3
ria-Hungary ..	29·9	22·9	52·8
a	5·4	41·3	46·8
.. .. ..	36·4	10·0	46·4
ium	23·1	19·5	42·6
Finland	17·7	20·5	38·2
Persia	14·5	17·5	32·0
Turkey	14·3	6·1	20·4
Egypt	3·8	13·6	17·4
Sweden	6·4	5·8	12·2
Denmark	9·1	2·3	11·4
Other Countries ..	52·5	53·9	106·4
Total	688·6	589·8	1,278·4

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[1] The value is calculated at the average rate of exchange for each period.

[2] The ruble averaged 2s. in 1896, hence moving the decimal place one to the left gives the value in pounds, *e.g.*, 184·0 million rubles = 18·40 million pounds.

BOOK II.: ASIA

CHAPTER XXIII.—THE CONTINENT OF AS

By A. J. Herbertson, M.A., Ph.D.,
Reader in Geography, University of Oxford.

Position and Dimensions.—Asia is by far the largest continents. Its area, 17½ million square miles, is more than that whole of the New World, and includes almost one-third of the surface of the globe. It lies wholly within the northern hemisphere its southern point, Cape Buru, at the tip of the Malay peninsula, within 90 miles of the equator. Cape Chelyuskin, the northern poi nearly half way between the Arctic circle and the North Pole: the distance between these extreme points is 5,350 miles. Between Cape the western extremity of Asia Minor, and Cape Dezhneff (East Ca Bering Strait there is a distance of 6,000 miles, and a range of 164° in tude, corresponding to eleven hours' difference of time. On all sides, the west, Asia is bounded by the ocean: on the north by the icy waters, on the south by the tropical Indian Ocean, on the east Pacific, whose northern waters are frozen near the shores in winte the west Asia is extended into Europe, and it is joined to Africa narrow Isthmus of Suez. Yet between Europe and Asia the Caspian depression placed the Arctic and Mediterranean seas in free munication in Quaternary times, giving to Asia a more distinct conti individuality than now appears. The continent, as seen on a globe, quadrilateral core from which many peninsulas jut out. Profess Wagner chooses as the angular points of this core the southern sh the Yugor Strait, Cape Dezhneff, Canton, and the north-western point Persian Gulf. Thus defined the core of Asia forms 80 per cent., and the sular part nearly 14 per cent. of the whole surface. The coast line of 3·2 times the minimum which could circumscribe its area. By this in coastal development is less than that of Europe or North America, but g than that of the three southern continents. It is only on the east th boundaries differ greatly from those of the continent proper. The i lying in wreaths on the east of Asia outline the eastern margin of the nental block. Those in the south-east form a great archipelago be Asia and Australia, and no definite geomorphological line divides into an Asiatic and an Australian group. "Wallace's Line," followi

ression which forms the Makassar Strait and runs between Bali and
nbok, is at most a faunal boundary, and is sometimes chosen as the
sion between Asia and Australasia. But the line of young volcanoes
ontinuous through Sumatra, Java, the Sunda Islands and the islands
veen Timor Laut (Tenimber) and Ceram, and can be traced
ugh the Moluccas and Philippines. Thus New Guinea and the Aru
nds are counted Australian, the others west of a line passing east of
or, Timor Laut, the Kei Islands and the Moluccas are reckoned
tic. The islands of Asia, thus delimited, have an area of over a
ion square miles; and the insular and peninsular parts of the continent
unt to one-fourth of the area of the core. In this respect also Asia
s next to North America and Europe, and comes before the southern
inents. These relations, however, depend on a somewhat arbitrary
nition of what constitutes a continental core or a coast-line, and are not
e strongly insisted on.

Coasts.—The northern coast lies almost entirely north of the Arctic
le. It is on the whole low and flat,
ning out in the Taimyr peninsula to the
t northern point, Cape Chelyuskin. The
t estuaries of the Ob and Yenisei open in
western part of this coast, which is here
etrated by fjords and fringed with islands,
according to Nansen, shows every evi-
ce of having been glaciated. The island
Novaya Zemlya encloses the Kara Sea
ch has a bad reputation for ice, but has
ntly been crossed every year by ships
ing the Yenisei during the few weeks
n the ice is broken up. East of the Taimyr peninsula the rivers
great deltas contrasting with the estuaries on the west, and
cating that the land has long been stationary with regard to the sea-
, not subsiding as in the west. Nordenskiöld alone has sailed round
north coast of Asia, and his name is perpetuated in the Nordenskiöld
between Taimyr and the New Siberian Islands. West of these islands
sen let the *Fram* become fast in the ice, and his soundings proved
the Asiatic continental block does not extend far beyond the Siberian
, and that the Arctic Sea is a depression of very great depth.

FIG. 223.—*The Continental Core of Asia.*

he north-eastern peninsula of Asia reaches within 36 miles of the
n-western peninsula of North America, from which it is separated by
hallow Bering Strait. The northern part of the Bering Sea, between
chatka and Alaska, is also very shallow. Thus the Arctic and Pacific
s are clearly separated, and in this region land communication
een Asia and America probably existed in the past. There are two
rn coasts to consider, that of the continent itself, and that of the
ng islands on the edge of the continental block. Both are as a rule

irregular and steep, showing evidence of being sunken coasts except the great rivers have built vast deltas, the flat shores of which have outlines. They are not sinking at the present day except perh eastern China. The inner coast has a north-east to south-west trer projects southwards in the volcanic Kamchatkan and mountainous peninsulas whose southern ends approach the outer fringing islands islands of Sakhalin and Formosa are other links by which the outer groups approach the continental shore. Four fringing seas lie b these peninsulas and islands, each bounded to the east by a l the island wreath. In the north the Sea of Okhotsk is bordered Kuriles, further south the Japanese Islands mark off the Sea of next the East China Sea is defined by the Luchu Islands, and south the South China Sea is bounded by the Philippines and Borneo northern part of the shallow East China Sea between Korea and the land is called the Yellow Sea. Its western shores are formed by t deltaic plain of the Yellow River (Hwang-ho), which carries down the earth that gives the name both to the river and to the sea. The Shantung peninsula rises like an island above the level alluvial lar projects eastwards forming rocky coasts with good harbours, and off the Gulf of Pechili from the Yellow Sea. A similar inner gulf off from the East China Sea by the mountainous island of Hainan south-eastern margin of the continental block towards the Pacific the Philippines and the Moluccas, and within it lie the fringing Sulu and Celebes. The bold convex arc of the Sunda Islands an northern prolongation in the Nicobars and Andamans towards the Ocean enclose the fringing seas of Banda, Java and Andaman. and Celebes are the largest islands lying between the two sets of f seas; and the south of the South China Sea might be regarde midland or mediterranean sea. The south-eastern, or Indo-Chinese sula of Asia ends in the long narrow Malay peninsula, which is miles wide at the Isthmus of Kra, where a ship canal would shorten the voyages from western to eastern Asia. The gulfs of S the east and of Martaban in the west, are alike in having the rapidly g deltas of great rivers at their head.

Asia projects into the Indian Ocean in two massive peninsul Dekkan and Arabia, which are not fringed by islands, but rise wi raced sides from the coastal plain, which is usually narrow. The tria Dekkan with its severed southern portion, the island of Ceylo nearly united by Adam's Bridge, lies between two wide round- gulfs, the Bay of Bengal and the Arabian Sea. The rectangular A peninsula, on the other hand, is defined by the narrow rifts of the Gulf and the Red Sea, the former silted up by the sediments of rivers, the latter of great depth and terminated in one arm by the sandy Isthmus of Suez across which a ship canal has been cut Mediterranean. The other arm runs, as the Gulf of Akabah, in the

great Dead Sea rift; and between the two the rocky Sinai peninsula . The entrance to the Persian Gulf is through the shallow and narrow it of Ormuz, that to the Red Sea through the narrower if less shallow it of Bâb el-Mandeb.

The plateau of Asia Minor projects westwards and sinks abruptly to Mediterranean and Black Seas. In the west the indented ria-coast is ged by many picturesque islands which unite with those of the Balkan nsula to form the Greek Archipelago. The Sea of Marmora, joined to Ægean by the Dardanelles and to the Black Sea by the Bosporus, es as the historic dividing line between Europe and Asia.

Surface and Chief Divisions.—Asia is divided into four great ral divisions, each of which has marked physical characteristics.

1) *The Northern Lowlands*, a vast plain rising gradually to the south to the east. One quarter of the continent is less than 600 feet above sea-level, and by far the greatest part of this is in the north. These hern lowlands are continuous and homologous with the northern plains urope, and together they form the Old World Lowland Area.

2) *The Central Mountains*, a band of lofty folded mountains and eaux widening to the east and running from west to east across Asia. e than one-twelfth of the continent lies above 10,000 feet, and most ne elevated land is in this mountainous region, which is continuous and nologous with the folded mountains of Europe, and together they form Old or Mid-World Mountain Area.

3) *The Southern Tablelands* of the Dekkan and Arabia are table- ls and not folded mountain regions, with little land over 6,000 feet. y form the north-eastern outliers of the great Indo-African or Old rld Tableland Area. They are separated from the rest of Asia by the Indo-Gangetic and Mesopotamian flood plains, and from the African ion of the Old World Tableland by the rift valley of the Red Sea.

4) *The Eastern Volcanic Mountains*, a belt of mountains bordering the ern and south-eastern edges of the continental block, and rising as ging islands above the waters that cover the continental shelf. This on has no exposed plateaux, and is largely volcanic; it forms part of Pacific Volcanic Area that girdles that ocean. They are separated from rest of Asia by the eastern fringing seas.

Asiatic Portion of Old World Lowland Area.—The simplest livisions of this area in Asia are the river basins, which give five nct regions, one of inland and four of oceanic drainage.

1) *Turan*, or the region of inland drainage, mainly to Lake Aral. se plains are covered with wind-blown desert sand, except near the ntains along the river courses and round the lakes, where water-borne osits of recent origin are found, and in the Ust Urt upland of tary rocks between Lake Aral and the Caspian Sea. The surface of land round the Caspian is below sea-level. In the east the surface to the bordering mountains whence the rivers flow. The most

important are the Amu-daria (Oxus) and Syr-daria (Jaxartes) flowi
Lake Aral, and the Ili to Lake Balkhash.

The region of oceanic drainage belongs to the Arctic drainage are
is known as the Siberian Plain. Here, as in the European Lowland
main valley-lines (*Thalwegs*) strike from south to north, and are join
others running mainly from east to west. A generalised section of S
from west to east shows a
of very gradual ascents b
by shorter and steeper falls
the great rivers flowing i
hollows (Fig. 225).

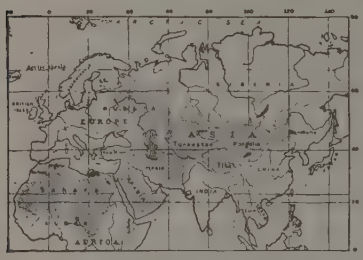

FIG. 224.—*Old World region of Internal Drainage (stippled.)*

(2) *The Ob-Irtysh Region* lie
of the Urals, from whose
eastern slopes several river
to the Tobol, which lies i
south to north valley-line.
great tributaries all enter fro
east. Most of the basin is ov
with recent deposits, but Me
rocks appear in the lower course of the river south of its great estua

(3) *The Yenisei* and its three tributaries—the Lower Tunguska
Middle or Stony Tunguska, and the Upper Tunguska or Angara—
another great river system. The Angara drains Lake Baikal, a
and long trough in the crystalline mountains. Most of this basin is
tableland of Palæozoic rocks, with Mesozoic deposits south of the
of the Angara and round its course after it leaves Lake Baikal.
recent eruptive rocks are found on the Lower Tunguska.

(4) *The Lena Basin* is composed of a similar succession of
Unlike the two western rivers the Lena has no estuary, but forms a
delta where it enters the Arctic Sea. Some of the secondary valley
run from west to east. The main river rises *west* of Lake Baika
does not turn north until near its junction with the Aldan in 13

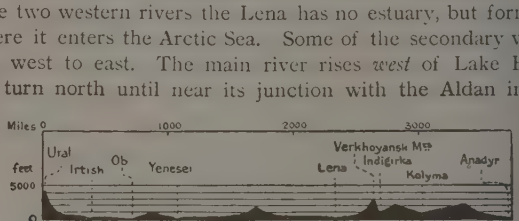

FIG. 225.—*Section across Siberian plain from W.S.W. to E.N.E about lat. 60° N.*

(5) The extreme *North-East of Asia* forms a distinct region borde
the Verkhoyansk-Stanovoi heights, composed probably mainly of Pala
rocks, which run from the Lena delta to St. Lawrence Island. The
Indigirka and Kolyma are the chief rivers draining this little-known
to the Arctic Sea. During the summer months the great Siberian
are navigable, but they possess the great disadvantage of flowing

rmer to colder climes where the ice covers the sea most of the year. spring the upper portions of the rivers thaw long before the lower ches, and great and dangerous floods are consequently frequent.

Asiatic Portion of the Old World Mountain Area.—At first ght the Asiatic mountains seem a complicated and unrelated series of nges; but a closer examination shows a certain symmetry that has racted many students, whose views of their relationship are not always ncordant. Professor Suess sees in the region between the Yenisei, near asnoyarsk and Chita, east of Lake Baikal, a centre round which the various iatic mountain ranges can be grouped from Sakhalin to Java, from the malaya to the Persian Gulf, without asserting that this was the centre action whence these ranges were folded. From the pre-Cambrian to the est times the same forces have been at work folding the strata along e same lines; the youngest folds being those at the periphery. chthofen, Naumann d others have also awn maps showing e fundamental axes folding and their lationship to each her. For most pur-oses it is more con-enient to consider the ountains from the entre of the Pamirs, region separating the wer western ranges d plateaux from the ftier mountains and ateaux of the east. ne Pamir region is lled by the dwellers there the "roof of the world," and, as the name Pamir ally indicates, consists of a series of valleys and ridges. The ridges e several thousand feet above the valleys, whose floors are at the great erage elevation of 11,000 feet above sea-level. From the Pamirs the ountains spread out both west and east. The eastern ranges separate as y pass eastward. The western ranges are drawn together in the menian plateau to another node, which is neither so compact, so exten-e, nor so lofty. Two very different regions spread longitudinally oughout this vast mountain area; a northern one of relative depression, outhern one of relative elevation. The Yalta (Crimea), Caucasus, Tian n, Altai and Yablonovyi mountains rise steeply from the Old World Low-ds and form the northern ranges of the Mountain Area. South of these lie hollows of the Black and Caspian Seas with the Kura depression between, l the Kara-kum and Shamo basins, with the Kizil-su valley between.

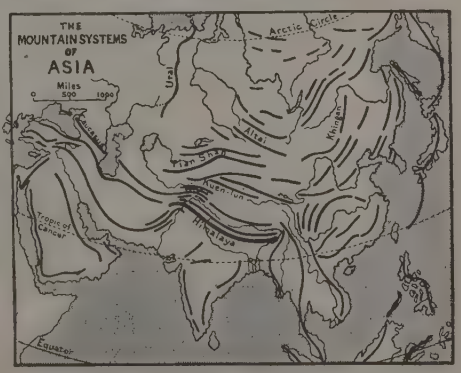

FIG. 226.—*Mountain Systems of Asia.*

The central ranges, Pontus, Elbúrz, Hindu Kush and Kwen-lun, rise stee from these depressions, but have much shorter slopes on the south to plateaux of Asia Minor, Iran, and Tibet. These plateaux are bounded on south by the Taurus, South Persian, Sulaiman, and Himalaya ranges, wh have short slopes to the plateaux on the north, but very steep slopes the flood plains which separate the Old World Mountain Area from Tableland. Most of these mountains have an axis of Archæan rock w sedimentary strata of different ages, down to the early Tertiary, which w formed before the last upheaval, on either flank. Great glaciers desc from the snow gathered in their loftiest hollows, whence many la rivers flow to southern and eastern seas. The Euphrates and Tigris ris the Armenian plateau, collecting tributaries from the southern ranges t meet there, and flow to the Persian Gulf, forming the Mesopotam flood plain. The Indus, Ganges and Brahmaputra carry water fr the southern ranges to the Indian Ocean. They make great fl plains which separate the mountain area from the Dekkan. The Sal and Mekong rise in the east of Tibet, and flow in deep valleys betw

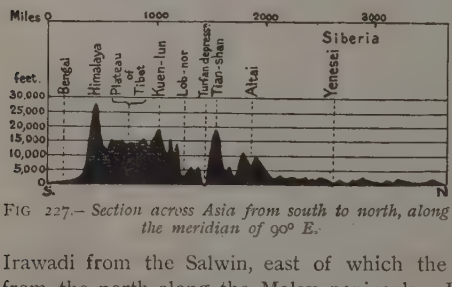

FIG 227.— *Section across Asia from south to north, along the meridian of 90° E.*

the three great mount ranges of the south-east peninsula to the sea. T western or Burma-Su range passes through A kan, the Andaman a Nikobar islands, Suma Java, and the sma Sunda Islands. A mi range separates the ri Irawadi from the Salwin, east of which the great Malay range pas from the north along the Malay peninsula. East of this another mi range separates the Menam from the Mekong valley, which is bound by the Annam range. These mountains are composed of old crys line and Palæozoic rocks, but the Burma-Sunda range contains abu dant recent volcanic rocks and many active volcanoes. South and north the Kwen-lun, known as the Tsing-ling in China, two great rivers fl from Tibet to the east—the Yangtse-kiang and the Hwang-ho, or Yell river. South of the Yangtse-kiang is a region consisting of older mou tains formed by a succession of faults, and not by folding of the stra which consist of Palæozoic marine layers and Mesozoic deposits not marine origin. In the south the land is drained by the Si-kiang or W river and by the Song-ka or Red River of Tongking. The Hwang-ho h cut its channel deep into the loess of northern China, and formed a v fertile flood plain above the level of which it flows for the last few hundr miles.

Asiatic Tablelands.—Ceylon, the Dekkan and Arabia, differ from t rest of Asia in their geological as well as in their tectonic condition. C

ystalline rocks predominate; but in the north-west of the Dekkan and in rabia great flows of recent eruptive materials are found. The Dekkan ap forms a rich hygroscopic soil, especially favourable for cotton cultivaon. There are also old sedimentary rocks in this area, which differ from ose of the rest of Eurasia by containing a flora, characterised by the ssil Glossopteris, which is related to that found in similar rocks in ıstralia, South Africa, and parts of South America, thus pointing to eographical changes of vast dimensions since the time when Gondwanand stretched across what is now the Indian Ocean.

The Eastern Volcanic Mountains are characterised by their ung volcanic rocks and the number of still active volcanoes; which retch from Kamchatka through the Kurile Islands and Japan, through the hilippines, the Moluccas, and the Sunda Islands. Old crystalline and l eozoic rocks are not wanting; Tertiary and Quaternary deposits are uch commoner than ose of Mesozoic age. hese mountains rise om profound oceanic epths, and over the tic area earthquakes d other seismic disrbances are frequent d often severe.

Climates of Asia. The vastness of Asia akes the climate of rge areas severely ntinental, with great xtremes of cold in the rth and of heat in e south. Only the south and south-east coastal lands have fairly iiform temperatures throughout the year. The mean annual temperature ig. 228) corrected for altitude is nearly the same across the whole breadth the continent in the same latitude; but is somewhat lower on the east ast than in the west. In winter (Fig. 229) this condition remains unaltered the south; but in the north the air temperature falls from all sides wards a pole of cold in north-eastern Siberia, where at Verkhoyansk, 400 et above the sea, the mean January temperature is —60° F., a degree of ld unknown in the Polar regions. In summer (Fig. 230) the north of the ntinent shows a uniform temperature from west to east in the same lati-, but in the south there is a heat centre in north-west India, Baluchistan d Arabia, in which the mean temperature for July exceeds 95° F., and und which less heated air is found on every side. The vast height of the ountain and Plateau region brings about great local differences of tem-rature, the temperature of Tibet being always low. The seasonal tempera-

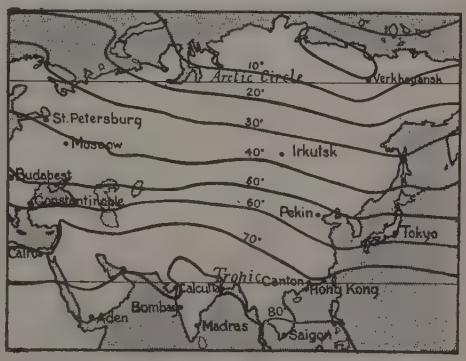

FIG. 228.—*Mean annual isotherms for Asia.* (*After Buchan.*)

ture changes determine two well-marked pressure conditions—a w
high-pressure system which is most powerfully developed over Mon
and a summer low-pressure system which is most intense between the m

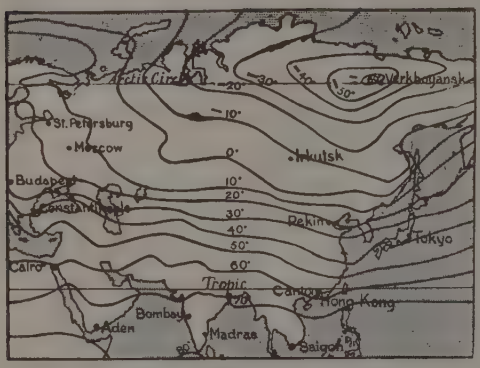

FIG. 229.—*January isotherms for Asia.* (*After Buchan.*)

Indus and the Gu
Oman. The w
winds of the cont
are consequently
flowing, the sur
winds are inflo
The cold outflo
winds of winter
dry, and over the w
of Asia hardly any
falls at this seaso
cept in regions w
the winds are defl
upwards by moun
especially after pa
over the sea.

Malay Archipelago and Peninsula and Ceylon, as well as the extreme
of the Dekkan, are near enough the equator to have the double
seasons characteristic of sub-equatorial regions. The rest of the cont
receives rain from the inflowing winds of summer, and these fall
heavily where the course of the surface wind is normal to that of the
mountain ranges, *e.g.*, the western mountains of the Dekkan and B
and the eastern ranges of the east coasts. Local topographical varia
deflect the rain-bearing wind; and thus the southern slopes of the Himalaya and of the Khasia Hills receive abundant rains. Only the interior regions, shut off from oceanic influences by very high mountains, have little or no rain in summer, and are in consequence deserts.

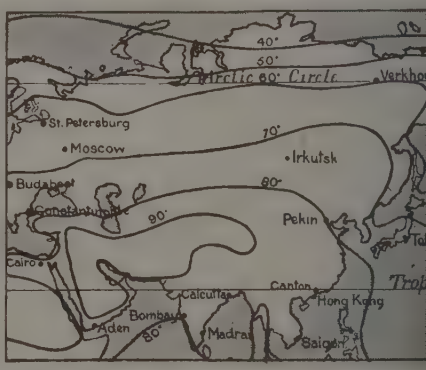

FIG. 230.—*July isotherms for Asia.* (*After Bucha*

Climatic Areas.—Asia may be divided into five great climatic areas—(1) *The Arctic Cold Dry Area*, with a mean temperature not exce
50° F. in the warmest summer month, and a mean rainfall never over
in the wettest month. This is a small region almost entirely within the

rcle. (2) *The Siberian or Temperate Continental Area* has great severity of nter cold, but the summer temperatures range from 50° to 70° or 75° F. The mperature extremes are greater in the east than in the west. Hardly any in falls here in winter, but in the short summer a mean monthly fall of om 1 to 2 inches is observed. (3) *The Central* or *Arid Area*, including rabia, Iran, Turan, Taklamakan and Gobi, is one of varied elevation d of varied temperature conditions. Most of it is very dry, but slight nter rains characterise the west, whereas what precipitation occurs in e east falls mainly in summer. The extreme south of Arabia is also region of summer rains. This area exhibits in a high degree the siccation characteristic of the central plateaux of great mountain ranges. ne arid basin of Taklamakan, for example, abounds in ruined cities of a ne when rain must have been abundant, land fertile, and population dense.) *The Monsoon Area* includes India, Indo-China, and the eastern coastal nds, where rain falls when the inflowing summer winds blow. The south this area is much warmer and more equable in temperature than the rth, where cold winters are the rule. The regions within this area which ve winter rains are the south-east of India, and of Indo-China, and the west Japan. The monsoon winds set in and cease at different times in different rts of the area. During their prevalence the atmospheric conditions main relatively steady, but at the periods of change they are very stable, giving rise to the dreaded cyclones of the Indian Ocean, and the phoons of eastern waters, which often do great damage both on land and ships at sea. (5) *The Sub-equatorial Area*, characterised by two rainy asons, is always warm and always wet, so that we should speak of its ssessing two less wet rather than two dry seasons in the year.

Minerals and Soils.—The mineral wealth of Asia is very great. ie precious stones and metals have long been famous: the diamonds ciently cut and sold at Golconda, the Ceylon sapphires, the Burma ries, the jade of Turkestan, and the gold of the Caucasus and of an. Gold is found in the Ural, Altai, and the mountains of the north- t, and this gold zone probably extends across the Pacific to the Yukon gion. These mountains are also all rich in many other minerals, and so the mountainous provinces of China. The tin of the Malay peninsula, the per and mercury of Japan, the silver, copper and graphite of Siberia, rock salt of India and the salt in the dried up lakes of the deserts may mentioned as useful minerals already largely utilised. Iron is found in ny regions, but is little worked by modern methods. Rich petroleum lls occur in the Caucasus, Burma, and Sumatra; and the immense l-fields of China, and some of the eastern islands, including Sakhalin, an, and Hainan, which are hardly yet used, lock up vast stores of wealth. Large areas of northern Asia are enriched with loam. Much of dry centre is covered with wandering sand dunes, beyond which fine loess is blown over vast tracts of land which are highly fertile ere water also exists. The Indian and Indo-Chinese peninsulas have a

surface of laterite, a clay rich in iron formed in warm, wet, tropical regi
The flood plains of the great rivers are covered with a fertile alluv
whereon rich crops are grown.

Northern Vegetation Zones.—The soils determine three great fl
areas. The *glacial* or *fluviatile soils* of the north and east support for
the *æolian soils* of the centre and south-west are steppe lands or des
and the *laterite* regions of the south and south-east are wooded. But
climate is the chief factor determining the distribution of the different p
associations ; and the three great typical soil areas, which are themse
largely conditioned by climatic factors, can be subdivided into sma
districts with different types of vegetation. In the Arctic climate a
only the surface of the soil is thawed during the brief summer, and it
frozen desert most of the year. Here no trees can grow, and the p
association is termed *Tundra ;* the vegetation includes low shrubs of bi
willow, larch, spruce, and other plants that are trees in better conditi
and berry-bearing bushes such as the cranberry ; but the most characteri
plants are lichens and mosses. During the brief summer poppies, s
frages, and many of the plants found on European mountains burst int
brief season of bloom, when the land is gay with many coloured flow
The Siberian climate area where loam exists is a land of *Forests.* The typ
plants associated together are coniferous, the larch (*Larix Siberica*)
firs (*Abies Siberica*) predominating ; but birches, poplars, and other t
familiar in temperate Europe abound. The forests can be traced farth
north along the river valleys. In the south the deciduous trees becc
more abundant, and alter the aspect of the forest ; and still farther sou
belt of birch woods forms the transition from forest to steppe land.
forests are thick and in many places impenetrable. Brehm has give
vigorous description of the forest primeval, with its contrasting glades
living trees and thick underwood of clematis, rhododendron and hon
suckles, climbing over dead, fallen and rotting trunks. Meadow la
with bright summer flowers exist in the Siberian area, and predominat
the rich grass steppes further south. Towards the east the proportion
European species in the forests diminishes, and in the Amur basin cor
to a minimum, while Chinese and Japanese species increase in numb

Steppes and Deserts.—The dry conditions which permit
transference and accumulation of wind-blown soil militate against
development of large trees. The loose porous soil and the extremes
heat and cold serve to promote a rapid growth of grasses and other annu
during the short moist season, but these perish even more quickly th
they rose, and are preserved until the next moist season by their ha
seeds or roots. The *Steppe* lands are of two kinds, grass steppes border
the forests, and poor steppes passing into sterile deserts. The gr
steppes of south-western Siberia lie between 50° and 55° N., and reach
far east as the Ob. Similar steppes exist east of the Altai and south of
Sayan and Yablonovyi mountains, in the upper valleys of the great riv

ing in eastern Tibet, at the base of the mountains enclosing the Tarim sin, rising from Turan and in the south-west of Iran. The snows of the gh mountains are a source of water for these steppes; and where peren- l streams flow, rich oases are formed along their courses. The irrigated gions yield fine fruits, vegetables and cereals. Poor steppes are found ınd the true desert regions, and all steppes may be divided by their rela- n to the three low and the three lofty areas of inland drainage—(1) The *ranian* or Caspian-Aral-Balkhash region passes from salt desert through or steppe with saxaul (*Borszowia aralo-caspica*) to the mountains, round ıich are fertile regions watered by the rivers. (2) The Taklamakan or *rim* region has much the same characteristics, the saxaul being the pical plant. (3) The *Gobi* or Mongolian region where grasses live, but rdly a bush is to be found. (4) The *Arabian* region is a continuation of e Sahara, with date-palm oases. (5) The *Anatolian* and *Iranian* desert gions have few plants, some, such as the *Astragalus Tragacantha*, yielding m tragacanth; and (6) the *Tibetan* region has a desolate tundra-like appear- ce, with coarse grasses and a few stunted trees in the less elevated parts. ıe moister sides of the mountains rising out of the steppe land may be)oded, but the vegetation in most places passes from rich grassy steppe poor steppe, and gradually into tundra just under the snow line.

Warm Zone.—In the north of the Warm Zone we find the *Sub- pical Forest Area*, the western region of which has winter, and the stern region summer rains. The Western or *Mediterranean* region, :lds olives, figs, pomegranates, Aleppo pines, cedars, myrtles, evergreen ks, and other trees on the lower mountain slopes, and Oriental ınes higher up. The Eastern or *Sino-Japanese* region has tea trees, mellias, and rich flowers, many of which, grown in European gardens, ıy be recognised by their specific names *sinensis* or *japonica*. The per slopes of the mountains of Japan and Korea are covered with eches and conifers such as *Fagus Sieboldi* or *Abies Firma*. The *vanna* area of Asia is found in the south of Arabia, in India, Indo- .ina, and the higher parts of Ceylon and the Malay Archipelago. uthern Arabia forms part of the African savanna area. The other gions may be grouped as the south Asiatic savanna area, and they are aracterised by great grasses such as the alang-alang (*Imperata cylindrica*). ıe moister lower regions of southern and south-eastern Asia contain dense *t jungles*, with a rich vegetation consisting of giant banyans, screw-pines, ty palms, and other great trees, up which innumerable creepers climb the light above, while saprophytic and other orchids, lycopods and)sses live in their branches. The mountain slopes above the plains are o covered with great forests, with sal and deodar in the Himalayas, and .k in the Dekkan and Burma, and areca palms in the Western Ghats, :l the Malay peninsula and islands south of 10° N., while *liquid amber*)ws on the middle slopes of the mountainous Sunda Islands. The pical growths flourish to nearly 3,000 feet above sea-level and then give

place to sub-tropical and temperate plants, the last disappearing ab
about 12,000 feet.

Economic Plants.—The rich flood plains and deltas of the great ri
of southern and eastern Asia are among the most fertile regions of the wo
They yield rich crops of rice, sugar-cane, cotton and indigo ; while in
drier regions wheat may be grown in irrigated districts. Coco-nut
sago palm, tamarind and bread-fruit are grown in the south-eastern isla
where spices, such as pepper, nutmeg, clove and vanilla are found. M
of the common cereals, wheat, barley, rye and oats, have long been cultiva
in western Asia, where date-palms grow in the oases of the deserts,
olives, vines, figs, pomegranates, oranges, and other fruits flourish ro
the Mediterranean. In Arabia coffee is cultivated, and also in south
India, where cacao has recently been introduced. Cinchona is grown in
south and south-east, yielding the anti-febrile quinine. In the far east
rice, cotton, sugar, lac, are among the chief economic plants, and in rec
years the cultivation of tea has spread from China to India and Ceylon

Fauna.—Tundra, temperate forest, steppe, desert, savanna, and
jungle, each contains its own association of animals whose habits are adap
to their surroundings. The lack of barriers in northern Asia gives a cer
unity to the fauna over this vast area, but the lofty mountains and w
deserts form impassable barriers to most forms, so that different fau
realms exist in the north and in the south. The extreme south-west s
off by desert, and the south-east with its isolating seas have each animal
different type from those of the north and south. North of the south
mountains the animals belong to the Palæarctic realm ; in India, In
China, and the adjacent islands to the Oriental realm. The south of Ara
is African in faunal as well as in physical characteristics, and the isla
east of Wallace's line are Australian rather than Asian in type. The t
ranges over the greater part of the south and east of Asia, and, with
elephant and rhinoceros, may be looked upon as typical of the south
part of the continent. The wild horse and camel feed on the steppes
central Asia, and huge mountain sheep (*Ovis argali* and *poli*) are well kno
as game on the Pamirs. Most of the domestic animals of the world ar
Asian origin. The reindeer is the draught and milk-giving animal of
Tundra. In the Tibetan cold and desert regions the yak is as important as
reindeer is in the north. The camel serves man in the great desert regio
round whose outskirts horses are the most important animals belonging
the nomad, and with his herds of cattle, sheep and goats, constitute
wealth. In many western regions the donkey of a fine breed is invalua
and mules are common. The Indian buffalo is a draught animal, but
India, as in China and Japan, where the land is fertile, it is too valuable
grazing, and few animals are kept, save pigs and fowls, for which ther
plenty of food, and which yield the fat and nitrogen so often lacking
vegetable diet. In India and Indo-China the elephant has been tamed,
performs many transport services. The great aquatic mammals are hun

n Polar seas for skin and oil and bone, and the pearl oyster is brought up y divers from the bottom of tropical waters.

People.—The more important groups of the White race represented in sia are the Semitic type of Syria and Arabia, the numerous tribes of the aucasus, the Slavonic people pressing eastwards across Siberia and in Turan, nd the Aryan people of Iran and northern India. The Yellow or Mongo- an type is the most numerously represented in Asia, and includes two- hirds of the inhabitants. The northern Mongoloids speaking polysyllabic nguages may be distinguished from the southern Mongoloids using so-called nonosyllabic tongues. Among the former are the various Finno-Tatar and Turki-Tatar races of the northern and of central Asia, the true Mongolians, nd the Manchus, all of whom may be grouped as Ural-Altai Mongols, and re to be distinguished from the Koreans as well as from the Japanese. The outhern Mongoloids include Chinese, Tibetans, various Himalayan hill ibes, Burmans, Siamese and Annamese. The relationships of the north- astern tribes, sometimes called hyperboreans or Bering tribes, are not ell known. The Black type is represented in the south by the negroid Dravidians of the Dekkan and Ceylon, who are quite distinct from the Negritos of the Malay Peninsula and Archipelago. These have been ushed into the interior by the Malay races who occupy the coasts and avourable places; and have probably a large proportion of Mongoloid lood.

Occupations.—By far the greatest part of Asia is occupied by many omadic tribes, relatively few in individuals when compared with the mass f settled inhabitants of the Indian and eastern plains. The northern and orth-eastern tribes are hunters and fishers, and in so far as they rear eindeer, are also pastoral. Pastoral nomads occupy the rest of the con- nent that is not cultivated. Agriculture is carried on in Asia Minor and Mesopotamia, along the river courses and on the oases of central Asia, in outhern Siberia, and down the Amur, including the region north of ladivostok, in Korea, southern Manchuria, northern China, the Dekkan, nd the Upper Ganges and Indus flood plains. The soil is so carefully ultivated in Japan, and most of China-proper, that we may call these gions gardens. There also manufactures of all kinds flourish, but as yet ie modern factory system of Europe has been introduced into few places Asia. Tropical plantations exist in south-western Arabia, the Dekkan, eylon, Bengal, Assam, Burma, on the flood plains of Indo-China, and the alay Archipelago. Much of the Malay peninsula and of the islands of the alay Archipelago is so very fertile that the inhabitants have to do little ore than clear the surface of the ground and plant cuttings to obtain good ops. It is natural to find that the south and east are the most densely opled regions of Asia, and it is estimated that over 830 million people live India, Indo-China, China, Korea, Japan, and the south-eastern islands, *i.e.*, alf the population of the world on one-tenth of its surface. The rest of sia has only 70 million people, and of it an area half as large as Europe

is practically uninhabited. The total population of the continent is estimat at 840 millions, 55 per cent. of the human race.

History.—The physical configuration of Asia has largely determin its history. On the northern plains the conditions have been unfavourab to the growth or agglomeration of population, and hence to the developme of any important civilisation or religion. South of the central barrier mountains and deserts, three distinct natural areas of favourable conditio have developed characteristic civilisations. Of these the oldest is probab that of Mesopotamia, the rich alluvial flood plain of the Euphrates a Tigris, which has been the seat of a series of important empires, the mo ancient, that of Chaldea, reaching back to the dawn of history. Throu the narrow strip of Mediterranean coast-line Mesopotamian civilisation i fluenced the development of Europe, and was influenced by it. An equal opulent and magnificent civilisation grew up on the flood plains of t Himalayan rivers, but the mountain and desert barriers on the north, a the sea on the other side, confined their influence to a more limited are The third great Asiatic civilisation arose on the flood plains of t Yangtse-kiang and the Hwang-ho, and its records reach back to a remo antiquity. The wealth of all these regions has naturally always expos them to invasion by attracting the cupidity of the nomads of the stepp but the progress of barbarian aggression became irresistible, as the gradu dessication of central Asia made it absolutely necessary for the nomads quit their withering pasture grounds. This drying-up of central Asia probably the ultimate explanation of such great events in the world's histo as the successive Mongol conquests of China, the Mongolian settlement the Russian plains and Hungary, and the downfall of the Roman Empi Even India, with its almost impenetrable barriers of mountain and dese was attacked. The last great pastoral invasion of the west, which ma the fairest part of western Asia and the eastern capital of the Roman wor the prey of the Ottoman Turks, took place less than 500 years ago, and ev as late as the seventeenth century the expansion of the Turkish Empi was a menace to Europe.

While Asia has thus expanded into Europe, influences have been work in the opposite direction. What was first prompted by the ambiti of individual conquerors, from Alexander onwards, is now the outcome the economic conditions of Europe, and has become the settled policy its Great Powers. Greek and Roman civilisations succeeded each other Asia Minor, but until modern times no western Powers penetrated mu further. The ancient Armenian nation subjugated by the Turks, has mai tained its religious faith and its national character, though its territory parted between three empires. The development of sea power afforded new means of aggression, and helped to shorten distance. Portugal, Spai Holland, France and the United Kingdom all founded empires in easte Asia. Little remains of Portuguese and nothing of Spanish possessions the east, but the Dutch still hold most of the Malay Archipelago. India w

ıbjected from the sea by the French, and then by the British, who have ·elded the isolated States into an empire, and control the key positions on ıe routes both to east and west. France has conquered a new empire in ıe south-east and has interests in China, where Germany and Russia have so obtained a footing. The British colonies of Straits Settlements and ongkong are bases from which a vast commercial interest in China has een developed. These conquests, however, are mainly military, or at best ɔmmercial, *i.e.*, of the least permanent types. Very different is the steady dvance of Russia across the Turanian and Siberian plains, and more recently rough Manchuria towards northern China. Here the advance is the ıshing onwards of settlers into lands which are as yet sparsely peopled, ıd in which new routes have opened many regions well suited to the de-·lopment of the great Slavonic race. Persia, Afghanistan, Siam, and Korea ·tain a precarious independence through the rivalries of the Powers whose rritories border their lands. Japan has attempted to forestall European ɔnquest by copying European civilisation, and has itself adopted a policy expansion. The application of European capital and supervision, and e introduction of telegraphs and modern means of rapid communication e working an economic transformation in Asia, the outcome of which nnot at present be foreseen. So far it has relieved the pressure of estern needs by opening new markets, but as the industrial development Asia proceeds, the competition must be severely felt in Europe.

As Europe is typically the continent of limited monarchies, Australia at of colonies, and South America that of republics, so Asia may be oked upon as the continent of absolute monarchies, the principle of abso-tism is even carried out in the European possessions on the mainland, ıd in Japan alone is the government limited by a popular constitution.

Religion.—Asia has been the cradle of all the great world religions. ı each culture area a great religious type developed. Brahmanism, the ɔminant religion of India, professed by 208 million people, gave birth to uddhism, which is the religion of 425 million human beings in Tibet, ongolia, China and Japan. China, however, produced a religious or oral teacher of its own in the person of Confucius, whose precepts codify e ethics of a patriarchal agricultural people. These religions, like the vilisations with which they are associated, have exercised but little influence ı Europe. The centre of influence in both cases lay further west. Judaism, e purest of the Semitic cults, has produced two religions which have diated respectively west and north and east and south. The older, ıristianity, has become the religion of Europeans and their descendants, ıt has made little progress in Asia, where its adherents do not number millions. The younger, Islam or Mohammedanism, has spread over uth-western Asia, and extended eastwards to India, and even to China. was the motive power which led to the Arab conquests in Asia, in frica, and even in Europe; to the mediæval Persian empire; and to e Turkish invasions. It was ever a religion of the sword; and its pro

gress is attested by the fact that 160 million Asiatics now profess it. T religions of the northern Asiatic peoples and of the Negroids in t south-east are fetishistic, and have played little part in world histor

Asia, with its vast masses of population remaining passively in the pla of their birth, is the one stronghold of the spirit of the past; the great bu of the people live to-day as they lived when Marco Polo sojourned among them, or as they lived a thousand years before; and while the hordes wandering Asiatics have convulsed the world, and again and again turn the course of history, the stationary mass may still long resist the penetrati of European commerce, as it has for many centuries withstood Europe civilisation and religion.

STATISTICS.

THE CHIEF COUNTRIES OF ASIA.

	Area square miles	Population.
Asiatic Russia	6,394,000	24,700,000
Chinese Empire	4,278,008	400,000,000(?)
Indian Empire	1,800,000	294,000,000
Asiatic Turkey	654,000	17,000,000
Persia	650,000	8,000,000
Dutch East Indies	584,000	34,000,000
Afghanistan	250,000	4,000,000
French Indo-China	256,000	18,200,000
Siam	200,000	9,000,000
Japan	160,000	42,000,000
British Colonies	150,000	5,000,000
Korea	82,000	17,000,000

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CHAPTER XXIV.—ASIATIC TURKEY AND ARABIA

I.—ANATOLIA

By General Sir Charles W. Wilson, K.C.B., F.R.S.

Boundaries and Coast.—Anatolia occupies the westward extension of the Iranian plateau that stretches out like an arm towards Europe. On the north it is bounded by the Black Sea; on the west by the Bosporus, the Sea of Marmora, the Dardanelles, and the Ægean; on the south by the Mediterranean, Syria, and Mesopotamia; and on the east by Russia and Persia. The north coast is rocky, has no good harbours, and only one safe roadstead—Sinope, between the Bosporus and the Russian frontier. There are, however, several open roadsteads and small ports at which steamers ship the produce of the interior. The west coast is deeply penetrated by the waters of the Marmora and Ægean, and some of its inlets, such as the Gulf of Smyrna, form excellent harbours. For several miles it is only separated from Europe by the narrow channels, Bosporus and Dardanelles, that connect the Marmora with the Black Sea and the Ægean. South of the Dardanelles the coast is fringed with islands. The south coast is deeply indented by the broad bay of Adalia, and towards the east its cliffs give way to the low shore of the Cilician plain. East of Cape Alupo are the land-locked harbours of Marmarice and Makri, and further east are small ports at which steamers call. South of Cape Anamur lies Cyprus.

Configuration.—The Anatolian plateau rises from west to east, and attains its greatest altitude, above 6,000 feet, near Erzerûm. On the north it is buttressed by the Pontic coast range, which varies greatly in height, and rises abruptly from the sea. The only coast plains are the deltas formed by the Kizil and Yeshil Irmaks. On the south the plateau is similarly buttressed by the Taurus range, which in places has an altitude of from 7,000 to 10,000 feet. Except where the Pamphylian and Cilician plains intervene, the range approaches the sea. Farther east it is separated from Syria by the gorge of the Jihûn, and breaks down to the lowlands of Mesopotamia in a series of rock-terraces seamed by deep ravines. The western face of the plateau is broken by broad valleys, and only in the case of Olympus (7,600 feet) rises much higher than 2,500 feet. On the east the Anatolian passes into the Iranian plateau.

The Anti-Taurus range, which rises east of Sivas and runs south-west to Mount Taurus, divides the plateau into Western and Eastern Anatolia. In the first the most striking features are the great central plain with its salt lake; the absence of navigable rivers; Mount Argaeus (13,100 feet), and the

volcanic district to the south with its rock-hewn houses and undergrou villages; the subterranean flow of streams beneath the Taurus; the pi turesque lake district east of Dineir, and the number of hot medicin springs. In Eastern Anatolia, elevated plains are separated by mounta ranges that run from east-north-east to west-south-west. The princip features are the fertile volcanic district of Van, with its salt lake (area 2,0 square miles, altitude 5,300 feet), and the old craters Sipan Dagh (12,000 fe and Nimrud Dagh; the lofty Bingeul Dagh; snow-capped Ararat (17,1 feet), and the wild gorges through which the waters of the Euphrat and Tigris find their way to lower levels. The Pontic coast range, t plateau, and the Taurus are here roughly distinguished as Lazista Ermenistan, and Kurdistan—the countries respectively of the Lazis, t Armenians, and the Kurds. Kurdistan includes also the mountainou district, east of Mosul, through which the two Zabs run to the Tigris.

Some of the Anatolian rivers are of considerable size. From the hig plateau of Eastern Anatolia the Choruk Su (*Acampsis*) and the Yesi Irmak (*Iris*) run to the Black Sea, and the Euphrates and Tigris, aft reaching the lowlands of Mesopotamia, flow through them to the Persi Gulf. From the plateau of Western Anatolia the Kizil Irmak (*Halys*) a the Sakaria (*Sangarius*) flow to the Black Sea, and the Gediz Chai (*Hermu* and Mendere Chai (*Mæander*) to the Mediterranean. The Geuk Su (*Ca cadnus*), which rises in the Taurus range, and the Sihûn (*Sarus*) and Jihû (*Pyramus*), which rise in the recesses of Anti-Taurus, also discharge the waters into the Mediterranean.

The great plain of Western Anatolia is composed of lacustrine depos of the Tertiary period. Mount Taurus consists chiefly of Cretaceous lim stone, the Pontic range of schists and metamorphic rocks. Igneous roc of the Tertiary and later periods occur in many districts, and some of t minor ranges are of granite. The mineral wealth is great, but neglecte it includes gold, silver, lead, iron, coal, boracite, chrome, fuller's ear rock-salt, alum, kaolin, antimony, emery, and meerschaum. Serpenti and fine marbles are found in several localities. Anatolia is subject earthquakes of great severity.

Climate, Flora, and Fauna.—On the north coast summers damp, enervating heat are followed by cold winters with much rain a heavy falls of snow. On the plateau the summer is hot and the wint very cold, in Eastern Anatolia often reaching —15° or —20° F. On t south and west coasts the winter is mild and the summer heat is temper by sea breezes. Malaria is prevalent in some localities.

The Pontic range is clothed with magnificent forests of oak, fir, a beech, and on the higher slopes rhododendrons and azaleas flourish. On t ranges to the south, including the Taurus, there is less variety of folia in the forests. There is excellent wheat land on the plateau, and vario districts, according to climate, favour the growth of the vine, olive, f orange, lemon, apple, pear, maize, rice, opium, cotton and liquorice. T

central districts are almost treeless, and, as a rule, dreary and uninviting; but where the rivers break through the coast ranges the scenery is sometimes grand, often picturesque, and occasionally of rare beauty.

Bear, panther, lynx, wolf, hyæna, wild boar, chamois, ibex, moufflon, deer, gazelle, bustard, francolin, pheasant, swan, pelican, and stork are found. Trout abound in the mountain streams, and a species of herring is caught in Lake Van. Wiry horses and excellent mule camels[1] are bred on the plateau, which is also the home of the Angora (mohair) goat.

History.—Geographical position, close proximity to Europe, the absence of navigable rivers, and the few approaches to the plateau from the coast, have had an important influence on the history of Anatolia. The earliest routes to the East passed through it, and it has ever been the scene of an unending struggle between the influences of the East and West. Although kingdoms (Phrygia, Lydia, Pergamum, Pontus, Armenia and Seljûkian Rûm) have from time to time risen within its borders, it has never been the seat of permanent empire. At two periods—when Greek colonists, and later when Genoese and Venetians occupied the islands and ports of the coast, and grew rich as "middlemen" between the East and West—the history of the maritime districts had little in common with that of the plateau.

In the dawn of history Anatolia was occupied by non-Aryan races. Such were the "Hittites," whose capital was at Boghaz Keui, and the people of Biainas who dwelt at Van. When the Aryan immigration commenced is unknown, but in the western districts there must have been a great fusion of blood several centuries before the Persian conquest (B.C. 546). In the east the Armenians displaced the people of Biainas in the seventh century B.C. Alexander destroyed the Persian Empire (B.C. 334–331), and under his successors Greek culture and the Greek language prevailed amongst natives of the higher class. But western civilisation made little progress in the interior until the Roman period, and the most efficient agent in diffusing it was Christianity. Under the Roman emperors western Anatolia was Europeanised, whilst, after years of strife, all east of the Euphrates became a Persian province. The Arabs made predatory incursions (A.D. 661–867), but, except in Armenia, obtained no real hold of the country. The advent of the Seljûk Turks (A.D. 1071) initiated a long period of decay. For four centuries wave after wave of nomads —Turks, Mongols (1235), Timur and Tatars (1386–1402)—swept over the country and destroyed its prosperity and wealth. Constantly on the move in search of fresh pasture for their flocks, despising agriculture, caring nothing for town life, and heedless of the morrow, they rendered cultivation impossible, and forced the peasantry to become nomad or seek refuge in the mountains. From these disasters Anatolia has never recovered, and recolonisation from Europe can alone restore its pristine prosperity.

[1] Bactrian sire, Arab dam.

People.—The present population is partly sedentary, partly nomad partly Moslem, partly Christian. The sedentary inhabitants represent o he whole the races that occupied the country when the Seljûks fir appeared on its borders. The Moslems are the descendants of those wh changed their faith, the Christians of those who retained it. *Turks* whos ancestors settled in the towns and villages are met with throughout th country, and in some localities there are Turkish villages. *Kurds*, sedentar and nomadic, are widely spread. Their principal home is in the mountai tract called Kurdistan, which they have occupied from a remote perio They are of Median origin, and speak Kermanji and Zaza, two Persia dialects intermixed with Syriac and Armenian words. *Lazis*, who belon to the Caucaso-Tibetan race, and speak a language allied to Georgian, liv in the coast range east of Trebizond. In western Anatolia there are larg *Circassian*, *Tatar*, and *Bulgarian* colonies. *Greeks* are in a majority in th islands and on the west coast; and in Cappadocia and the Pontic coa range there are large Greek-speaking communities. In the isolated villag on the plateau the Greeks only speak Turkish. *Armenians* are found all Anatolian towns, but there are few Armenia villages west of the Sivas and Adana vilayets. certain districts of eastern Anatolia they form majority of the people, and occupy the towns high-lying valleys. The language is Armenian, but isolated villages the peasants only speak Turkish Kermanji. *Nestorians* live in the valleys of the Gre Zab and Bohtan, near the Persian frontier. The speak a dialect of Syriac, containing Persian, Arabi and Kurdish words, and are the descendants of Syria Christians driven to the mountains from Mesopotam by the encroachments of the nomads. The *Turkomans*, *Tatars*, *Avshar* and *Yuruks*, who are widely distributed, are nomads of Turk or Mong origin.

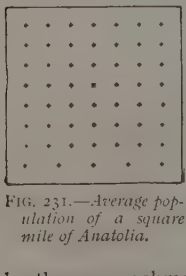


FIG. 231.—*Average population of a square mile of Anatolia.*

The Moslems are either Sunnis or Shias, the former being in a larg majority. The Christians belong either to the Greek Orthodox, th Armenian Gregorian, the Nestorian, the Protestant, or the Roma Catholic Church. All non-Moslems must belong to one of the recognise religious communities (*millets*), each of which has two representatives the Council of State at Constantinople. Education is backward among Moslems; but the Christians have latterly made great progress wi the assistance of colleges and schools established by the America Missions.

Trade and Communications.—Most of the people make the living by agriculture, which is in a backward state. Large numbers ar however, employed in the various mines and industries in the interior, ar as sailors, and in the sponge and other fisheries on the coast and in th islands. Silks, cotton stuffs, mohair cloth, carpets, sweetmeats, wine, soa

orice paste, and copper utensils are largely manufactured. The prin- l imports are textile fabrics, iron, coal, petroleum, and sugar. The orts are raisins, figs, wine, liquorice, wheat, olive oil, opium, drugs, gum acanth, raw silk, cocoons, mohair, wool, carpets, beeswax, tobacco, ges, hides, valonea, yellow berries, boxwood, timber, meerschaum, ls and ores. Austrian, French, Greek, and Russian steamers call at various ports, but most of the foreign trade is done with the United gdom.

During the Roman period Anatolia was intersected by well-kept roads; with the advent of the nomads wheeled transport disappeared and els and mules became the common means of transport. The roads e neglected, and it is only during the last thirty years that any attempt been made to improve them, introduce carts, and make railways. One of railway, which it is proposed to continue to Mesopotamia, runs the Bosporus to Ismid (*Nicomedia*) and Eskishehr (*Dorylæum*), nce one branch goes to Angora (*Ancyra*), and another to Konia *ium*). Other lines run from lania to Brûsa; from Smyrna anisa (*Magnesia*) and Alashehr *ladelphia*), with a branch to Hissar (*Thyateira*) and Soma; Smyrna to Ephesus, Aidin *lles*), and Dineir (*Apamea*), short branches to Denizli Chivril; and from Mersina arsus and Adana. Most of the ways are in the hands of man capitalists.

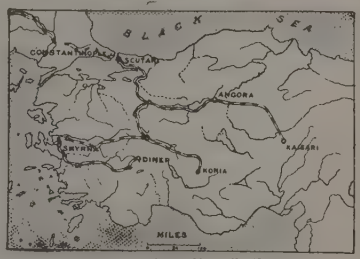


FIG. 232.—*Anatolian Railways*

Divisions and Towns.—Turkey in Asia is divided into provinces *yet*) governed by valis who are appointed by the Sultan. Each vali staff of civil servants, and is assisted by an administrative council hich the spiritual heads of the non-Moslem communities have seats. administrative purposes each vilayet is divided into districts (*sanjak*), districts (*kaza*), communal circles (*nahieh*), and communes (*karieh*) rned respectively by mutessarifs, kaimakams, mudirs, and mukhtars ce is administered in accordance with the common law (*nizam*), by criminal and commercial provincial courts, from which there is a ot appeal to the High Court at Constantinople. In Anatolia there ifteen vilayets, two separate sanjaks, and one principality (Samos). ngst the towns *Trebizond* (*Trapezus*) on the Black Sea, the capital of ld empire of Trebizond, is the natural trade outlet of Erzerûm and ern Persia, but Russian railways are rapidly diverting the traffic. sûn (*Amisus*), on the Black Sea, exports the produce of the Sivas et. *Skutari* (*Chrysopolis*), on the Bosporus, is a suburb of Constanti- . *Smyrna*, the most important town in Anatolia, and one of the

principal ports of the Ottoman Empire, lies at the head of a deep gul
is the natural trade outlet for the western districts. It has direct
communication with England. *Adalia* (*Attalia*) and *Mersina*, on the
coast, are the ports of the Konia and Adana vilayets. *Brûsa* (*Prusa*),
foot of Mount Olympus, is noted for the beauty of its situation, i
iron and sulphur springs, its silk manufactories, and the mosques and
of the early Sultans who made it their capital. *Angora* (*Ancyra*
ancient capital of the Gauls, is celebrated for its fruit, honey, and m
cloth. It gives its name to the Angora (mohair) goat and Angor
Konia (*Iconium*), connected with the missionary labours of St. Paul
later the capital of the Seljûks, lies near the southern edge of the
plain of western Anatolia. *Kaisariyeh* (*Cæsarea*), at the foot of M
Argæus, whence roads lead by easy passes across the Anti-Tauru
been a trade-centre from the dawn of history. It is still the most i
tant commercial town on the plateau, and is remarkable for the ente
of its merchants. *Sivas* (*Sebastea*), in the valley of the Kizil Irmak,
centre of a rich wheat-growing district. *Erzerûm*, the principal to
eastern Anatolia, is a military station protected by a circle of det
forts. *Van* (*Dhuspas*), near Lake Van, is situated at the foot of an is
rock on which are inscriptions in cuneiform Van, Bitlis, and Mus
centres of Armenian districts.

Islands of Anatolia.—Some of the islands are very fertile,
are little more than lofty masses of rock that rise abruptly from th
Most of them have steam communication with Smyrna. They pr
fruit, wine, raisins, olive oil, and mastic. Sponge fishing is the prin
industry. The population is Greek, and Greek dialects are sp
Excepting Samos, they form the Archipelago Vilayet. *Tenedos* is
the mouth of the Dardanelles. *Lemnos*, midway between Mount
and the Dardanelles, has an almost land-locked harbour suitable for
ships. *Lesbos*, or *Mitylene*, between the Dardanelles and the G
Smyrna, was the home of the Æolian school of lyric poetry, an
birthplace of Alcæus and Sappho. It has two deep gulfs, which
land-locked harbours, and hot mineral springs. *Chios*, the most fer
the islands, is noted for its wine and mastic, and is the reputed birth
of Homer. **Samos** rose to great power under Polycrates (B.C. 532
became the centre of Ionian luxury, art and science. It was the
of Pythagoras, and for a time the residence of Antony and Cleo
Samos has a good harbour, and is very fertile. Since 1832 it has b
principality paying tribute to Turkey, but otherwise independent.
tainous *Icaria* is connected with the legend of Icarus; and on r
Patmos, twenty miles south of Samos, St. John wrote the Apoca
Further south are *Leros*, *Kalymna*, *Kos*, with its memories of Hippoc
Nisyros with its hot sulphur springs, and *Syme*, a broken, rugged
with two good harbours and a large trade in sponges. *Rhodes*, the
eastern island of the Ægean, has played a conspicuous part in histor

powerful fleets, and its maritime laws were embodied in the Roman law. Its capital, Rhodes, at the north end of the island, was one of most magnificent cities of antiquity, and had, at the entrance to its our, the bronze "Colossus of Rhodes." For two centuries it was the ghold of the Knights of St. John, who, after successfully resisting the s in 1480, surrendered to Suleiman I. after a famous siege in 1522. island is only partially cultivated. Between Rhodes and Crete are *athos* and *Kasos*.

II.—CYPRUS

By the late Lieut.-Col. Sir R. Lambert Playfair.

Position and Surface.—Cyprus is the most eastern island in the iterranean. Seen at a distance from the west it has the appearance vo islands parallel to each other, owing to the two mountain ranges h run along its northern and southern shores. These are separated n extensive plain of Tertiary formation called the Mesorea. The hern range, that of Kyrenia, extends Cape Kormakiti on the west to Cape ndreas, at the extremity of the narrow of land, called Karpas, which stretches to the north-east for a distance of 47 s, with an average breadth of not more six miles. This range has its crest y serrated and its sides rather steep, and re it falls to the sea it is bordered by only a narrow plain. The est summit is the castle-crowned peak of Buffavente, 3,135 feet high, the most remarkable as to shape is Pendactylon, named from its mblance to a hand with the fingers outstretched. The southern e is that of Troödos, or Olympus. Its highest point is 6,406 feet, red with noble forests, and now used as a summer station for the sh troops.

Fig. 233.—*Cyprus.*

The extreme length of Cyprus is 140 miles, and its greatest breadth 60 s. It does not contain a single river, properly so called; what figure ich on the map are winter torrents, dry in summer, or with only a few s here and there. There are a few lakes, the largest being the salines (æ) of Larnaka and Limasol, both of which, when dry in summer, a large supply of salt.

History, People and Resources.—Cyprus is the Chittim of ture, represented as the resort of Tyrian fleets. The Phœnicians lished settlements there about B.C. 1045. After the decay of Tyre sland was occupied by colonies from Greece; it passed successively r the dominion of the Assyrians, Egyptians, Persians, Romans, Saracens Byzantines. In 1191 Richard Cœur de Lion took it and assumed the of king. Two years later he made it over to Guy de Lusignan, whose

successors became tributaries to the Sultans of Egypt. In 1373 it taken by the Republic of Genoa, which held it for ninety years, whe Venetians took it, and in 1571 it was conquered by the Turks. B Anglo-Turkish Convention of 1878 the administration was handed o Great Britain. The people, mainly of Greek race and language, b mostly to the Orthodox Greek Church, but about one-quarter of the lation are Mohammedans. In early times the hills of Cyprus were de wooded, but the great demands made on its forests for smelting or for shipbuilding were the main causes of their destruction. The prin drawbacks to agriculture are the uncertainty of the seasons and the tion of locusts. The chief products are cereals, cotton, wine, oliv carobs, silk, salt, sponges and leather. An important source of wea ancient times was copper (*Æs Cyprium* = Cupr Copper), and mining has recently been recomme

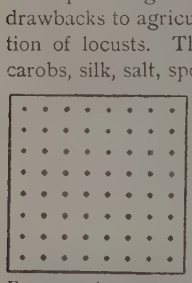


FIG. 234.—*Average population of a square mile of Cyprus.*

Towns.—*Nicosia* (Greek, *Levkosia*), the capit the central plain, was the residence of the Lusi kings; its monasteries were numerous, and there about 300 Greek and Latin churches. *Famagust* the east coast, has fortifications which were the of the Lusignans, Genoese and Venetians; the in good preservation, but the town itself is ru and filthy. The harbour is the only one in the i that could be made available for large vessels, but it is silted up with and the unhealthiness of the site renders it unfit for a military st *Larnaka*, on the south coast, the ancient Kitium, the rival of Tyre, an birthplace of Zeno, founder of the Stoics, is the principal comm emporium of the island, and the residence of the foreign consuls. no harbour, and the roadstead is exposed to the south and east. Th town is about a mile and a half from the sea; the newer portion, the shore, is called La Scala, or Marina. The antiquities of Cyprus a varied as they are numerous, and there is hardly a museum in the worl has not a collection of objects found in Cypriote tombs. The local mu at Nicosia contains a good collection of the treasures unearthed sinc British occupation.

STATISTICS.

	1891.		1901.
Area of Cyprus	3,584	..	3,584
Population of Cyprus	209,286	..	237,022
Density of population, per square mile	58	..	66
Population of Nicosia	12,515	..	14,752

STANDARD BOOKS.

L. P. Di Cesnola. "Cyprus, its Cities, Tombs, &c." London, 1877.
C. D. Cobham. "A Bibliography of Cyprus," 2nd ed. Nicosia 1894.

III.—MESOPOTAMIA

By General Sir Charles W. Wilson, K.C.B., F.R.S.

Position and Surface.—Mesopotamia includes all Turkish territory
n of Diarbekr, which lies between the eastern edge of the Syrian
rt and the foot of the mountains that buttress the Persian plateau.
opotamia proper, the country between the Euphrates and the Tigris,
a gradual fall of 950 feet from the spurs of the Taurus range to an old
t-line south of Hit. Thence an almost unbroken plain extends to the
ian Gulf. The great plain of Upper Mesopotamia is broken by low
es of hills between which the Khabur and its tributaries flow to the
hrates. Between the Khabur and the Euphrates lies the Biblical
n-Naharaim, a fertile district watered by the Belik, once cultivated
thickly peopled, but now waste. On the plain east of Mosul, between
Tigris and the Khazr, was the heart of the Assyrian Empire. The
ntain district that borders the plain and extends to the Persian
tier forms part of Kurdistan. The lower plain (ancient Babylonia),
n of Hit, was formerly a vast expanse of fertile land intersected and
ated by canals. It is now almost uncultivated and partially covered
fever-breeding swamps. At Kurna the Euphrates and Tigris unite,
their combined stream forms the Shatt el-Arab. The delta of the
t river is advancing at the rate of about 72 feet per annum, but the
is liable to frequent inundation. The hills of Upper Mesopotamia
limestone. The plain south of Jebel Sinjar is a dreary flat, with a
oil of gypsum and marl, intersected by nullahs. At Hit, Hammam
and other places are petroleum, bitumen, sulphur, and salt springs.
climate is good in winter, but so hot in summer that people usually
the day in underground chambers (*serdab*). The lion, leopard, wild
wild boar, and gazelle are found in certain localities.

History and People.—The early history of Mesopotamia is one of
tant struggles for supremacy between contending nations. But the
ıtry remained rich and prosperous until the battle of Kadisia (A.D. 635)
ed it at the mercy of the Arabs. As the nomads pressed forward the
ants were driven from their lands, the great irrigation works were
ected, and the Euphrates, no longer controlled, spread out into wide
hes. What the Arabs commenced Turks, Mongols and Tatars com-
d, and one of the most fertile regions of the Earth was abandoned to
ıds. The majority of the population is now Arab, sedentary and
ıd ; but the original inhabitants are still represented by Kurds, Yezidis
Devil Worshippers," Nestorians, Chaldæans or Roman Catholic Ara-
ns, and Jacobites in the north ; and by Sabæans in the south.

Trade, Communications and Towns.—The only manufactures
or home consumption. The chief exports are cereals, dates, wool,
rice and hides ; and the imports sugar, cloth, coffee, indigo, iron and

copper. The foreign trade is chiefly with the United Kingdom, Indi
Persia.

On the Tigris passengers and merchandise are carried from Dia
to Baghdad on rafts of inflated sheepskins. Below Samara sailing
are used. From Baghdad river steamers run to Basra, whence th
steam communication with India and England. In flood time a st
ascends the Euphrates as far as Meskineh, but there is no trade. Al
transport is by mule or camel.

There are four vilayets and one separate sanjak in Mesopot
Amongst the towns are *Diarbekr* (*Amida*), at the head of raft navig
on the Tigris; *Urfa* (*Edessa*); *Harran*, "the City of Nahor"; and *M*
on the Tigris, opposite the mounds *Kuyunjik* (*Nineveh*). *Baghdad*
city of Harûn er-Rashîd, has a large transit trade. It occupies a
rivalled position as a centre of trade, but has lost much of its f
wealth. *Basra*, on the Shatt el-Arab, is the port of transhipment
river craft to ocean steamers, and has a large trade in dates. *Nejef*
Kerbela, the burial places of Ali and Hussein, lie west of the Euph
some miles from the mounds of Babylon. They are the "Holy Pl
of the Shia Moslems, and every year large pilgrim-caravans arrive
Persia bearing corpses to be buried within the sacred precincts.

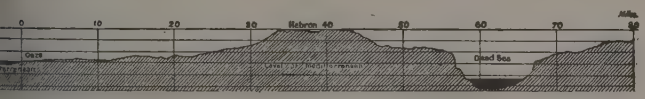
IV.—SYRIA

By General Sir Charles W. Wilson, K.C.B., F.R.S.

Position and Surface.—Syria, which includes Palestine, stre
southward from Anatolia, and is separated from it by the deep gorg
the Jihûn and its tributaries. Its western limit is the Mediterranean
eastern the valley of the Euphrates. On the south Wadi el-'Arish sep
it from Egypt, but no natural feature parts it from Arabia. The
towards the north is rocky; towards the south low, and in places s
There are no good harbours, but several open roadsteads and small
at which steamers call—Iskanderûn, Latakia, Tripoli, Beirût, Haifa
Jaffa.

Syria and Palestine comprise a coastal plain of varying width
parallel ranges of mountains between which lies a remarkable depre
and a plateau falling eastward to the Euphrates. On the nort
mountains approach the sea, and here the coastal plains are smal
narrow. But south of Mount Carmel the hills recede from the sho
leave room for the broad fertile plains of Sharon and Philistia. The
range is known under different names. The Giaour Dagh (*Mons A*
extends from the gorge of the Jihûn to the valley of the Oronte
though rarely more than 6,000 feet high, is crossed by only tw
passes—the Amanian and Syrian "gates." Between the Orontes an
valley of the Nahr el-Kebir (*Eleutherus*), "the entrance of Hamath

ugged Ansariyeh mountains, over which there is no good pass. South e Eleutherus is Mount Lebanon, which has its culminating point in r el-Kosdib (10,050 feet), and is crossed by only one good pass. The e of the Litany (*Leontes*) separates Lebanon from the hills of Galilee, h gradually break down to the plain of Esdraelon and valley of the on. Southward of Esdraelon stretches the hill country of Samaria and a, which falls away, south of Hebron, to the desert plateau of et-Tih. of the coast range is the great rift-valley, or depression, in part below evel of the sea, that extends from the base of the Giaour Dagh to the Sea, and probably far into the heart of Africa. In this valley flow the tes and its tributary, the Kara Su; the Leontes and the Jordan. The tes and Leontes rise near each other between Lebanon and Anti- non, and one flows north, the other south until both cut their way ward to the sea. The Jordan rises west of Mount Hermon, and after ding out into Lake Huleh and the Sea of Galilee discharges its waters he Dead Sea, 1,292 feet below the level of the sea. From Lake Huleh e Dead Sea, which is salt and has no outlet, the course of the Jordan ow the sea-level. Between the Dead Sea and the Gulf of Akabah the ession is known as the Arabah. The range east of the depression is



35.—*Section from the Mediterranean across the Dead Sea.* (*Heights exaggerated* 8 *times.*)

lways well defined. In the north it is a long unbroken ridge of lime- , called the Kurt Dagh. Farther south it is continued by Anti- non, which ends abruptly in Mount Hermon (9,200 feet); and it n represented by the hills of Bashan, Gilead, Moab and Edom. ard of this range the ground falls gradually to the Euphrates. of Aleppo, where the distance between the Mediterranean and ver is only from 110 to 140 miles, the plateau presents the character ling downs broken by rich well-watered valleys. South of Aleppo ateau gradually broadens out into an extensive pastoral district, with t supply of water, which east of the Dead Sea is between 500 and iles wide. This district, known as the Syrian desert, stretches ard into Arabia. With the exception of the sandstone and granite f Edom, limestones prevail throughout the country. Igneous rocks in a few localities west of Jordan, and east of the river there are areas of basalt—the Leja, Hauran, &c., which correspond to the s of Arabia. The most important geological feature is the great valley hollowed out along a line of fracture and displacement of the s crust before the Cretaceous period. Bitumen and bromine are d from the Dead Sea, and petroleum would probably be found

by boring. Near Tiberias and near Umm Keis (*Gadara*) there ar sulphur springs.

Climate and Resources.—The climate of the coast and hill co is not unlike that of southern Italy, but in the Jordan valley, near the Sea, it is almost tropical. Snow falls heavily on the mountains of nor Syria, and occasionally as far south as Jerusalem. The summers o eastern plateau are intensely hot.

The cedars of Lebanon are now represented by small groves, and are no large forests such as exist in Anatolia. In certain localities, ever, the hills are well-wooded, and in the Jordan valley the vegetat sub-tropical. Wheat is grown on the coast and upland plains, the fig, and vine are cultivated in the hills, and the downs of the e plateau afford pasturage for countless flocks of sheep. But the gro still for the most part waste, and though the ancient terrace-culture places being restored, it will be long before the country can recover the ruin and desolation of centuries. Bear and panther are found northern districts, deer and gazelle occasionally in the south. Ther close affinity between the fauna of the Jordan and the rivers of tr Africa. The crocodile still lives in the Nahr ez-Zerka, south of Carm

History and People.—At the earliest period of which there record northern Syria was in the hands of a strong power—the Kh "Hittites," whose capital was at Kadesh, on the Orontes. Palestin at the same time, occupied by a number of petty States sometimes sometimes subject to Egypt. Later the Phœnician cities, including and Sidon, rose to great power and splendour; and the Jews e Palestine, where they created a kingdom that attained its widest ext the reign of Solomon. Hittites and Jews were alike conquered by As and the whole country afterwards passed first to Persia, then to Seleucids and Ptolemies, and next to Rome. Syria and Palestine easy and early prey to the Arabs, and, like Anatolia, they were wholly or in part overrun by nomad Seljûks, Mongols and T Agriculture was destroyed, towns were deserted, and the rich turned into a wilderness. In the eleventh century the ill-treatment Christians by the Moslems at Jerusalem and in the Holy Land led Crusades. Jerusalem was taken in 1099, and a Latin kingdom estab in Palestine, which lasted for eighty-eight years. At the same Antioch, Tripoli, and other places were erected into principaliti countships. In the sixteenth century Syria was conquered by the Os Turks, in whose possession it still remains. The most momentous in the history of the country are those connected with the birt ministry of Christ and the spread of Christianity after His crucifixion

In the Giaour Dagh and the country eastward to the Euphrat people, excepting in a few Armenian villages, are of Turk or M origin, and speak Turkish. To the south Arabic is spoken, but the lation is of varied origin. The Ansariyeh are partly descendants

nal inhabitants of the mountains, and partly of Persian origin. They hip the Sun and Moon. The Maronites of Lebanon are Christians belong- o an indigenous race akin to the Ansariyeh. The Druses, who dwell ebanon and the Hauran, are partly indigenous and partly of Persian n. South of the Litany the peasantry (*fellahîn*), whether Christian or em, are for the most part of Canaanite origin, but there has been a fusion of blood. In most of the inland towns the Moslems are of and the Christians of Aramæan origin. Jacobites are thinly scattered the country. The Syrian desert is occupied by nomad Arabs, who mes advance to the vicinity of Aleppo, Homs, Damascus, and the an. Colonies of Germans, Jews, and Circassians have been estab- d during the last thirty years, and Palestine is dotted with monasteries pied by Greek, Latin, Russian, and other monks.

Trade, Communications and Towns.—Silk, half-silk stuffs, , and articles for sale to pilgrims are manufactured, but the principal pation of the sedentary population is agriculture. The chief exports wheat, fruit, wool and hides; the imports mainly textile fabrics and goods. There is an excellent carriage-road from Beirût to Damascus, inferior roads run from Iskanderûn to Aleppo, Haifa to Nazareth, and to Jerusalem. Lines of railway connect Beirût with Damascus and with Jerusalem, and a steam tramway runs from Damascus to the ran. Other inland transport is by mule or camel.

n Syria there are two vilayets, one separate sanjak, and one district anon), with a special constitution guaranteed by the European Powers. ngst the towns are: *Iskanderûn* (*Alexandretta*), the port of Antioch, po, and parts of Mesopotamia, near the Beilan pass. *Beirût*, the of Damascus, and the largest maritime town in Syria. *Aintab*, east ie Kurt Dagh, with a large Armenian community and an American ge. *Aleppo*, a place of military and commercial importance from the est times. *Antioch*, on the Orontes, the ancient capital of Syria. *escus*, the largest town in Syria, built amidst extensive gardens, he edge of the desert, beneath Anti-Lebanon. *Jerusalem*, in the of the hill country of Judæa, is sacred alike to Christian, Jew and em. The city, which contains the sepulchre of Christ and the rock which Mohammed is said to have ascended to heaven, is annually d by numbers of Christian and Moslem pilgrims. *Hebron*, in the hills of Jerusalem, is the burial-place of the patriarchs.

V.—ARABIA

By General Sir Charles W. Wilson, K.C.B., F.R.S.

osition and Coasts.—The Arabian Peninsula stretches southward Edom and the Syrian desert, of which it is a direct continuation. Its s about one-third that of Europe, and its form is strikingly regular.

On the north, where there is no natural frontier, a line joining the he
the Gulf of Akabah with that of the Persian Gulf (very nearly the pa
of 30° N.) is generally adopted as the boundary. On the west, soutl
east its shores are bathed, respectively, by the waters of the Gu
Akabah and the Red Sea, of the Indian Ocean and of the Persian
Isolated thus in a measure, and traversed by no important trade
Arabia had little in common with the great empires of the ancient w
But her position was favourable to maritime enterprise, and the keen
mercial instinct of her people soon led them to push their fortunes be
their own shores. At a remote period the south coast became the s
a sea-borne trade with south-eastern Africa on the one hand, and
and the further East on the other.

The west coast is almost a straight line. It has open roadst
difficult of approach on account of shoals and coral reefs, but no
harbours. Towards the south there are small islands, of which the
important is Perim, at the entrance to the Strait of Bâb el-Mandeb.
south coast, from the strait to Ras el-Hadd, is slightly convex tow
the Indian Ocean, and has some good harbours—Aden, Dafur, and Kes
The east coast, from Ras el-Hadd to Cape Masandam, is nearly paral
the west coast, and has the almost land-locked harbour of Muscat
Masandam the oceanic coast line ends. Beyond it lies the shallow Pe
Gulf, with its low, sandy shore stretching eastward and northward t
harbour of Koweit, or Grane, near its head. Close to the narrow ent
to the gulf are several islands (Jishm, &c.); and the coast of Katar, be
Masandam, is bordered by islands (Bahrein, &c.), celebrated for
productive pearl fisheries.

Configuration.—The relief of Arabia is also regular. The table-
which extends southward from the Syrian Desert, is buttressed by c
ranges that attain their greatest altitude in the south, and are often ru
and precipitous in outline. The centre of this mass is occupied
plateau with long, undulating slopes, covered with pasture, and
narrow valleys in which lie irrigated gardens and plantations. Th
Nejd, the true home of the Arabs. In the latitude of Mecca a ridge
Nejd to the western coast-range. Elsewhere it is bordered by arid de
or wastes of shifting sand, the Nefuds. Between the coast-ranges an
sea there is a low-lying strip of sand and coral *débris*, with a hot cli
and forbidding aspect. This is the Tehama, a name specially appli
the Red Sea littoral south of Mecca. As the valleys of Arabia origina
no well-defined ridge, the line of water-parting is irregular. Many o
districts are well supplied with water, but no stream of any size re
the sea. The central plateau, the desert, and the coast range (incl
the Tehamà), each occupy about one-third of Arabia.

Geologically, the peninsula apparently consists of granites, trap-
old basalts, on which lie Cretaceous sandstones continuous with th
Petra. Limestones, sometimes with flints, overlie the sandstones, a

north (*Arabia Petræa*) the surface is covered with flint gravels. At vals, on a line, approximately parallel to the Red Sea depression, are lava beds (*harra*) with their craters, which may be compared with e in Syria and Palestine. The largest are Harrat el-'Aue, near Medain , and Harrat Khaibar, north of Medina.

Climate and Products.—The climate varies greatly. The coast icts are hot and unhealthy. The mountain districts of Oman are hy and cool. On the central plateau, where heavy rains fall in spring autumn, the days are hot, and the nights cold. In Yemen the winter erature often falls below freezing, whilst in summer it is rarely over °. in the shade; rain falls in March and again in July, August and ember. As far north as et-Taif, east of Mecca, rain lasts about five s in autumn. In the north rain is rare and falls in winter.

he most fertile district of Arabia is Yemen, where coffee, fruit and ables are extensively cultivated. Senna grows in southern Hejaz and Tehama, balsam in Safra, near Mecca, henna on the west coast, incense adramût, indigo on the shore of the Persian Gulf, and the date palm ny places. Coco-nut, betel, banana, &c., have been introduced from , and thrive well. The only important routes in Arabia are those which pilgrims travel to Mecca from Syria, Egypt and Persia.

he horses of Arabia have always been celebrated. The best, for h high prices are demanded, are bred in Nejd, where the pedigrees arefully kept. Riding camels (dromedaries), with good pedigrees, from Nejd and Oman. Common camels are often reared and kept eir milk, wool, and flesh. The large white donkeys of Hassa and rn Nejd are much prized in Egypt and Turkey. Broad-tailed sheep red in Yemen and Nejd, goats in Hejaz, cattle with a hump in Yemen, n and Nejd, and cattle without a hump in the north. Ostriches are d on the central plateau, small tigers in Oman and Nejran, and the er, lynx, hyæna and gazelle in several localities. The pearl-fisheries e east coast are said to yield nearly £300,000 per annum.

eople.—The population is very sparse. The inhabitants, excepting ish officials and soldiers, belong to two great septs—the Joktanites he Ishmaelites, both having Arabic as their language, and Islam as religion. The Joktanite tribes occupy the southern districts, and are nore ancient. They are descendants of Shem, through Joktan *an*), the father of Hazarmaveth (*Hadramût*), Sheba (*Saba*), Ophir, and s. The sept is divided into three stems descended from Saba (*Abd ems*, "servant of the Sun"), through his son Himyar, and his grand- Malik and Arib. Hence they were called Sabæans. The Ishmaelite , also called Nizarites, are descended from Ishmael, through el-Yas, Keis Alan the grandsons, and Rabiah, the son of Nizar. The tribe of sh, to which Mohammed belonged, was a branch of el-Yas. The important historical events are the foundation of a new religion. , by Mohammed, and the rapid rise of the Arabs to power. The

flight (*Hejra*) of Mohammed from Mecca to Medina (Friday, Jul 622 A.D.) is the date from which Moslems commence their era. Prophet died in 632, and ten years later the Arabs had conquered Pale Syria, Mesopotamia, Persia, Egypt, and North Africa. At presen tribes in Hejaz, Yemen and Hassa are subject to Turkey; those in are practically independent, and those between Aden and Muscat p tribute to, and have no communication with, Turkey.

Hejaz and Yemen.—The western coast-range of Arabia, continues the mountains of Moab and Edom, has no defined crest Here and there it is broken by broad valleys, and one of these, Wadi H separates Madian (Midian) from Hejaz. The Turkish province of **H** extends from Madian to Yemen, and is from 60 to 150 miles wide. pilgrim routes from Syria and Egypt pass through it, and the sou end in which Mecca lies is known as the Haram, "sacred territory." water is brackish, and, in some of the wells, tepid. *Mecca*, the place of Mohammed, is about fifty miles from *Jedda*, its port on the Sea. A pilgrimage to Mecca is incumbent, once in his life, on Moslem, and every year the holy city is crowded with pilgrims, m whom travel by sea, and disembark at Jedda, the seat of governm *Medina* also lies inland from its port *Yambo*. The trade, except d the time of pilgrimage, is small.

The Turkish province of **Yemen** occupies the south-west corn the peninsula. Beyond the Tehama the mountains rise rapidly to a h of from 6,000 to 10,500 feet. They are cut up by deep ravines, and slopes are terraced for the cultivation of coffee, wheat, fruits and tables. The highlands of Yemen consist of a succession of gently sl valleys, which are terraced and cultivated, and form the platea Nejran on the north, Sanaa on the south, and Mareb on the east. roads in Yemen are zigzag paths, with massive, perhaps ancient, pa The soil, disintegrated trap rock, is rich, and generally bears two cr year. The capital, *Sanaa* (7,600 feet), has a population of about 3 including 5,000 Jews. Its port is *Hodeida*, where the coffee and hid Yemen are shipped. Yemen was the seat of the oldest and most impo of the Arab monarchies, and its merchants traded with India at an date.

Aden.[1]—The British settlement of Aden is almost the most sout point on the Arabian coast, being situated in 12½° N. latitude and 4 longitude. It is a peninsula of an irregular oval form, of about 15 mi circumference, connected with the mainland by a narrow, sandy isth The town and part of the military cantonments lie in a large c enclosed by precipitous hills, the highest peak of which is 1,775 feet a the sea. The whole place appears utterly sterile, but it is not with flora of a very interesting character, containing at least 100 species of p

[1] By the late Sir R. Lambert Playfair.

climate during the north-east monsoon, from October to April, is and agreeable, but during the rest of the year the heat in the crater is great, although at Steamer Point, on the western side, the sea breezes refreshing.

den became a British possession in 1839, when the town was a plete ruin, with not more than 600 inhabitants. Now it is large and shing, with about 30,000 inhabitants, Arabs, Somalis, Jews and ns, without including the garrison and European officials. A large of its supplies comes from the British Somaliland protectorate on the an coast. The harbour is about three miles wide at the entrance, and is shelter in all weathers for vessels drawing less than 20 feet. It surpassed by any on the Arabian or adjacent African coasts, and is of the most important coaling stations in the world. Recent defensive s have made it practically impregnable. Being a free port, like ltar, it has become the principal *entrepôt* for the trade of all the bouring countries. The natural water supply is very limited, but ensers have been erected at the our, and the magnificent ancient voirs, capable of containing twenty on gallons of water, have been ughly restored to catch the rare all.

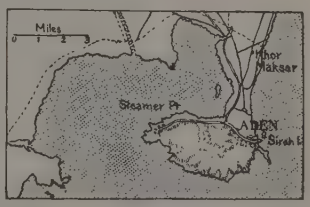


FIG. 236.—*Aden Harbour.*

erim.[1]—An important dependency den is the island of Perim, at the h of the Red Sea, which was an- d during the war between Great in and France in 1799, when it eared that Napoleon contemplated a junction with Tipu Sultan in . Subsequently, owing to the increase of steam communication gh the Suez Canal, it became necessary to facilitate the dangerous ation of the Red Sea, and Perim was again occupied, a lighthouse ; built upon it. It is not fortified, and its fine harbour is leased by a te company as a coaling station.

or administrative purposes Aden and Perim are placed under the rnment of Bombay.

adramût (Hazarmaveth), the centre of the ancient trade in myrrh rankincense, is a broad valley in the sandstone district which, for one red miles, runs nearly parallel to the south coast, and discharges its s into the sea east of Saihut. The capital, *Shibam*, is in the valley ; ort is *Makalla*. East of Hadramût are Dhofar, the old frankincense ry, and Mahra, with fertile coast plains, and mountains clothed with cal vegetation.

man, a mountainous district, lies between Ras el-Hadd and Cape ndam. The principal range, Jebel Akhdar (10,000 feet), is partially

[1] By the late Sir R. Lambert Playfair.

covered with vegetation, and its coast plain is fertile and cult
There is a small trade at *Muscat*, the capital. The kingdom of
attained its greatest splendour early in this century, when it includ
islands of Sokotra and Zanzibar. Its proximity to India has often in
it in relations with that country. West of Masandam, and north
Hassa, a district of the Turkish province of Basra, there is little c
tion except near Katif and Grane.

Central Arabia.—The northern portion of Central Arabia (1,
2,500 feet in elevation), which has a hard gravel surface with stunted
and sparse grass, is intersected by two wadis that terminate in the
of Jowf and Teima (*Tema*). South of Jowf lies a desert of sand,
by the wind into high ridges called Nefud, and sometimes diffic
cross on account of want of water, and the simûm—a circular
of heated, sand-laden air—that moves slowly across the deser
a cyclone. Further south are Harrat Khaibar (5,400 feet), with
well-cultivated valleys; the fertile depression of Kasim (2,000 feet
the Towik plateau, or Nejd. The plateau, over 5,000 feet, is
one hundred miles wide, and is separated from the coast distri
Hassa and Katif, on the east, by a desert of reddish sand from
sixty miles wide. On the west it is connected with the coast-ran
a ridge about 4,000 feet high. Politically the plateau is divide
the districts of Sedeir, Woshin, Ared, and Aflaj. South of the plate
the hot, fertile district of Yemama, the peaks of Haruk (2,000 feet
the Dahna desert of burning, reddish sand, which extends from Yem
Oman, and is estimated to cover 50,000 square miles.

STATISTICS OF ASIATIC TURKEY.

(*Estimates.*)

Division.	Area in Square Miles.	Population.	Density Populati
Anatolia	270,200	12,005,500	44
Mesopotamia	100,200	1,350,300	13
Syria	109,500	2,711,900	25
Arabian Provinces	173,700	1,050,000	6
Total Asiatic Turkey	653,600	17,117,700	26
Independent Arabia	1,230,000	8,500,000	7

POPULATION OF CHIEF TOWNS.

Smyrna	210,800	Baghdad	65,000	Erzerûm	
Damascus	180,000	Jerusalem	58,000	Mosul	
Aleppo	115,000	Kaisariyeh	48,800	Basra	
Beirût	110,000	Trebizond	45,000		
Brûsa	70,000	Sivas	43,100		

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HAPTER XXV.—THE COUNTRIES OF IRAN

I.—PERSIA

By Major-General Sir Frederic Goldsmid, K.C.S.I.

osition and Boundaries.—Persia is the *Pars* or *Fars* of Ezekiel, ne now given to a southern province of the Shah's kingdom only. ative name *Iran* applies to the whole upland country from Kurdistan ghanistan, of which the older inhabitants were "Aryans." Ancient , as existing some centuries before the Christian era, was an immense of territory extending west and east from the Mediterranean to the , and north and south from the Jaxartes to the Arabian Sea. Modern is said to comprehend an area of some 650,000 square miles, on the rn and larger portion of the great Iranian plateau. Yet its extreme th measured along the parallel of 34° N. from the Turkish to the n frontier, is scarcely 1,000 miles, while the length from the Daman- the mountain range on the Trans-Caspian Russian frontier, to the ast about the meridian of 57° E., may be reckoned at 900. The ern frontier is formed by the Aras river, the southern shore of the n and the Atrek; the southern is the sea coast, and on the west the ains of Kurdistan divide Persia from Turkey. On the east an lar, but in parts well-defined, frontier commences somewhat west of on the Hari-rud, runs southward bordering Afghanistan, turns ly to the Helmand follows the foot of the Baluchistan hill-range, aking a curve to the west crosses Mekran southerly to the sea in ide 61° 53′ E.

nfiguration.—Persia is an elevated tableland dropping to the n Sea along nearly one-third of its northern frontier, and to the n Gulf along its southern limit. In the central highlands there are ers, and the country is either composed of parallel mountain ranges oad intervening plains, or of irregular mountain masses with fertile basins and ravines. About one-third of the area is occupied by and saline wastes, quite irreclaimable and useless. For irrigation ins and valleys depend on the mountains which collect rain and The valleys are more fertile than the plains, often affording bright sque, and grateful prospects, while the latter are usually barren and vastes, scored, or streaked, as it were, rather than ornamented, with of green oases. With the exception of those dividing the coasts aspian from the inland plateau, and those bordering the Arabian Persian Gulf, the parallel mountain ranges generally stretch from

north-west to south-east. They are considered to present the geological features as the Zagros chain which consists of Creta nummulitic rocks. The Zagros is the whole mountain range from A to Shiraz, forming the gigantic frontier wall between Persia and T The occurrence of metamorphic rocks has also been noticed, as well extensive area of volcanic formations, some of very recent origin the northern and southern slopes of the lofty Elbúrz range are rich i and iron. The highest peak of this range, which overlooks the sou shore of the Caspian, is Demavend, a beautiful mountain not less 19,000 feet in height. Of the southern border-land of the Persian pl Blanford remarks that the part traversed by him appeared to cons low ranges running east and west, which, except near the sea, were a entirely composed of unfossiliferous sandstones and shales associated a few beds of nummulitic limestone, apparently belonging to the Tertiary epoch.

Rivers.—Among the few rivers which merit special mention ar Safid-rúd and Karun. The former flows into the Caspian near Enze ordinary port of embarkation for passenger traffic with Russia; the from its position and proximity to the Persian Gulf, offers imm advantages to Indian traffic and is, practically, and that only reference to small steamers, the one navigable river in the king Many of the rivers of the interior have an inland drainage, flowing lakes or losing themselves in the sand, for instance the Helmand, of v the upper part is wholly in Afghanistan. This lack of rivers is a grea to agricultural development; and the uncertainty of rainfall compe cultivator to trust too largely to the primitive *kanáts* or undergr galleries, which conduct water, so long as procurable, from the mou to the centres of cultivation. Famine and drought are unfortunate uncommon visitations in the "land of the Lion and Sun," and if sno as well as rain, and springs cease to issue, the result is truly deplo When there is irrigation, the productiveness of the soil is remarkable.

Climate.—The climate of Persia varies much according to loc In the high tablelands, that is over Persia generally, it is intensely co winter, and though hot in summer, the dry clear heat is temp compared to that of Sindh and the Panjab. In the north the lowlan the Caspian are covered with forest, and the atmosphere is damp, fev and relaxing. The maritime tracts on the south are so dry and ba that even the hot and violent winds which blow over them afford a ce amount of relief to the inhabitants during the prevalence of a scorc summer. Spring and autumn are the best seasons; October is perha its invigorating freshness, the most enjoyable month in Tehran and southern lower slopes of the Elbúrz; while February, owing to its bit cold winds, is to be avoided by the traveller, posting or otherwise ma his way to the capital from Tabriz.

From the absence of statistics of the rainfall the estimate of experie

idents must be employed to supplement the returns. Rain is fairly ndant in the north-western mountains, and on the shores of the Cas- n the amount probably varies from about 20 to over 40 inches. At ran the annual fall is about 12 inches; and on the plateau generally siderably under 10 inches. While more than 14 inches fall at Bushire the Persian Gulf, there are less than 6 inches at Yask. Summer is the st season. Remains of water-channels, used for irrigation, show how efully the scanty supply was husbanded in former days.

Flora and Fauna.—Forests are rare and not dense. No part of the ntry is so thickly wooded as the low tract south of the Caspian. ong the trees are the oak, beech, birch, elm, walnut, plane, sycamore, , yew, box and juniper. Amongst the flowers the roses are particularly ebrated. Numerous gardens and some beautiful trees are commonly nd in the neighbourhood of large towns, not cared for as in Europe, pleasant in their wildness.

mong the wild animals are the lion, tiger, leopard, lynx, wolf, jackal, l ass, wild sheep, gazelle, and deer. The tiger is peculiar to the pian provinces, but is not a man-destroyer. ong game birds, three kinds of partridge are well wn, the sand grouse, and *Hubárá* or common ve bustard. Of domestic animals the horse, mule camel occupy an important position; oxen also used for tilling purposes. The "Persian cats," celebrated in Europe, are confined to a few lities.

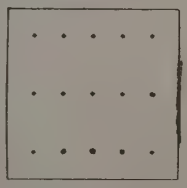

FIG. 237.—*Average population of a square mile of Persia.*

People and History.—Persia of to-day, despite diminished area, may be said to comprise quite much settled and consolidated territory as at period of its authentic history. The several invasions by neighring nations on its land frontiers, have naturally affected the racter of its population. On the north, Mongol, Tatar and Arab lers have mixed with the older inhabitants of Khorasan, and the ian element has lost much of its original purity. Again, on the west south-west, the Turkish *Kashkai*, the Arab *Kamisa*, and many like es are foreigners amid the descendants of the old Persian stock; and same may be said of the Afghans, Baluchis and peoples who hail from t of Kerman and Mekran, and even from the Indian peninsula. The rsique of the Persians is intrinsically fine, but seldom fairly developed. a rule, the rich and middle classes, in spite of high abilities and soning power, ruin their constitutions by sensuality and dissipation; le the poorer and working classes, with less power of reasoning, but lthier tastes and habits, have barely sufficient sustenance to give nature play. There are two distinct classes of inhabitants, dwellers in towns villages and dwellers in tents. The former class remains stationary ing the greater part of the year, only the richer people leaving the

towns during the summer heats. The nomads move from place to p according to the season. They include Arabs, Kurds, Lurs, Gipsies Turks; but are generally classed as Iliyats, and serve their own partic leaders, all acknowledging a hereditary chief called the *Ilkhání*. The c adherence to ceremony and etiquette, ready adaptation to foreign hal together with the capacity for using and love of receiving the finest fo of flattery, which in the days of Herodotus were found the not features of the national character, are still to be observed in the cap For an Oriental, the Persian is a bright companion, more active in m and body, and more intelligent than the Turk, and not so much a s to custom. He is obstinate and enduring, but without perseveran though often a spiritual dreamer, he refuses to think steadily on comm things.

Ninety per cent. of the people are Mohammedans of the Shi division, who maintain that the legitimate Khalifa or successor of Prophet was Ali his son-in-law; in opposition to the views of the Su to which sect most of the rest of the population belong. This distinc is the cause of constant internal conflict, an fatal to that political unity for which a comm faith offers the surest guarantee.

FIG. 238.—*Persian Royal Standard.*

Government.—The Shah is regarded Vicegerent of the Prophet; consequently acts are those of an absolute monarch, and will is the acknowledged law of the St Oriental despots, especially those profess the faith of Islam, have usually the sa besetting proclivities, and are educated one pattern, so that the regeneration of a kingdom like Persia only be looked for by the exercise of healthy influence from with If truth or honesty exists in Persia, it must be looked for in poorer and humbler classes, rather than among those who adopt veneer of European civilisation. Provinces and districts are sold the most lavish bidder, who if not wealthy enough to pay the he price himself must do so by practical robbery in the name of taxati It is not uncommon, however, to make the *Hakim*, or ruler of one of larger provinces, perhaps a Shahzáda or one of royal birth, onl nominal head, and to associate with him a really competent a intelligent *Wazir* or Minister, who does the whole work of administrati and, in his way, does it well. In such cases there is a kind of real just dispensed. With Turkey on one flank, Afghanistan and Baluchistan on other, and the Arabian Sea and Persian Gulf on the south, Persia finds northern frontier wholly occupied by Russia, and Russian influence trade and in the development of the country is predominant all o the north. The profession of a common Mohammedanism does necessarily draw the Turk or Afghan towards his Persian brother, a

re is comparatively little intercourse with west and east. On the sea , or southern line of boundary, the United Kingdom has more direct tions than any other State and dominates the commerce of the south. only is Indo-Persian traffic facilitated by ready communication with nbay and Karachi; but the existence of a British Protectorate for the ers west of Ormuz and the presence of a British Consul-General at hire, enable the Shah's Government to maintain its authority on the thern littoral of the Persian Gulf.

Trade and Communications.—The natural products of Persia are acco, silk, wool, cotton, grain (mainly wheat and barley), wine and um. In a more restricted sense may be added rice, jute and sugar; the cane has been indifferently cared for, and beetroot has not been le freely available to supply its place. There are also many medicinal dye yielding plants; gums such as assafœtida, rhubarb and liquorice the most parts wild and abundant. Fruit of many kinds esteemed in ope and Asia is good as well as cheap and plentiful.

The carpets are justly celebrated among Persian manufactures. Those le in Kurdistan, Khorasan, Ferahan (a district said to possess 5,000 looms), n and Kerman have, more or less, distinctive ures of their own; the first named being the e generally appreciated. Turkman carpets, n which the bazárs of Mashad abound, are in ute from their texture and velvety pile. Ispahan Yezd are famed for their *namads*, or woollen s. Another branch of interesting native in- try is the manufacture of shawls, for which man is considered almost equal to Kashmir. ey are woven by hand out of *kurk*, the under wool of the goats. Many ve Persian industries, such as the fashioning of sword-blades, brass and per vessels of all sorts, carved and inlaid metal and wood, together n exquisite ornamental tiles, are yet in full vigour, but some of them are y faint representatives of former days.

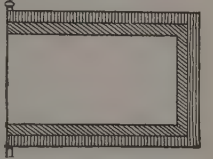

FIG. 239.—*Persian Merchant Flag.*

The few carriage-roads in Persia are limited to short distances of a dred miles or so from the capital, the chief being to Kazvin and Resht, it is probable that they will be extended and improved at an early date. re are many tracks and rough lines of traffic which could easily be dered practicable not only for *chapar* (or posting), caravans and mule- wn-litters, but for wheeled traffic. The physical difficulties in the way complete system of roads are great, but the results of such innovation, nce admitted, could not fail to bring profit both to the rulers and ple. The most important lines of communication for Persia are those ch connect the capital with Tabriz, Resht, Astrabad, Mashad, Ispahan, d, Kerman, Shiraz, Bushire, and the Turkish frontier at Kháníkín. only railway in the country which was ever completed is in the close nity of Tehran, and is only six miles long.

The Indo-European Telegraph Company works and controls the J
Tehran telegraph line (437 miles), and the Indian Government control
Tehran-Bushire line (675 miles), and assists in maintaining the Teh
Mashad line (568 miles) and the overland line from Kashan by Ker
and Baluchistan to India. A line[1] a
the Mekran coast from Karachi to J
(601 miles), and the Persian Gulf c
from Karachi to Fao, are also worked
maintained by the Government of Ind
part of the connection with Europe.

FIG. 240.—*The Telegraph lines across Persia.*

Towns.—No street in all the c
of Persia can be called respectabl
Europeans rate structural respectab
Blank mud walls and narrow ill-p
thoroughfares are the rule ; the windo
or terraced front of a Persian house i
the inner court or inner precincts of
abode, and not for the world without. S
mosques are handsome, some caravanserais solid, some bazárs h
creditable to the designers and builders ; but everything is irregular, not
is permanent, and architectural ruin blends with architectural reviv
the midst of dirt, discomfort, and a total disregard of municipal metho

Tehran, made the capital of Persia in 1788, is situated on a rivo
plain at the southern foot of the Elbúrz range. In 1797, Olivier w
of it as little more than two miles in circuit, with a population of 1
of which one third belonged to the court or army of the Shah. Th
has increased to thirteen times this amount in a century gives evid
that its site was judiciously chosen. But
the work of renovation and reconstruction
did not begin till 1870, since which year it
has been rapidly transformed from a mean
six-gated polygon with a frail enclosing wall,
to a city of eleven miles circumference with
European fortifications and twelve gates.
Whatever the estimate of its architectural
merits or deficiences in the eyes of European
critics, its claim to recently achieved pro-
gress cannot be disallowed. The European
Legations are situated in summer at and
near *Gulhak*, 700 feet higher than Tehran,
and 4,500 feet above the sea-level, a
locality providing luxurious retreats with grassy and well wa
gardens. *Tabriz* (or *Tauris*), the commercial capital of Persia, sit
close to the Turko-Persian frontier, was sacked by Timur in
and twice before that period levelled to the ground by earthqu

FIG. 241.—*A bit of old Teh*

alamity five times repeated within the last two centuries. Large and portant as the place is, there is little to note in it at the present day save Blue Mosque with its handsome tiles and inscriptions, still visible id its ruins, the bazárs, and the citadel. *Ispahan*, near the centre the country, was the ancient capital, and with its suburb *Julfa* ere the Europeans live, stands in a fertile plain. Though only a ck of its former splendour it is still the second city in Persia judged its commerce. *Mashad*, in the north-east on a tributary of the Hari-rud, he capital of the province of Khorasan and enjoys a high reputation as oly city and place of pilgrimage amongst the Shias. *Yezd*, almost in geometrical centre of Persia, is practically the only residence of the gious sect known as *Gabrs*, who still follow the teachings of Zoroaster the Parsis of Bombay. *Kerman*, situated far in the interior at an vation of 5,000 feet, is an important meeting place of trade routes ween the Persian Gulf and Central Asia. *Urúmíya* (locally *Urmi*) is ated 4,400 feet above the sea, in the fertile plain of that name, twelve es west of the great Shahi (or *Urúmíya*) Lake, of which the length is imated by Lord Curzon at 84, the breadth at 20 to 30, and the circum-ence at nearly 300 miles. It is interesting at the present day as the adquarters of the (Canterbury) Archbishop's Mission to the Assyrian or storian Christians. *Shiraz* in the south-west, reached by a steep and gged road from the ports on the Persian Gulf, is the cradle of Persian ionality and the capital of the province Fars which gave its name to the untry. Famed for its roses, wine and nightingales, Shiraz is celebrated he song of the great Persian poets. The chief seaport is *Bushire* on the rsian Gulf; *Linga* and *Bandar Abbas* also do a considerable trade with dia and Europe, mainly in British ships, but none has a good harbour.

STATISTICS

(*All statistics are estimates, some very uncertain*).

Area of Persia in square miles	650,000
Population	8,000,000
Density of Population	12

POPULATION OF CHIEF TOWNS.

Tehran	200,000	Yezd	40,000
Tabriz	170,000	Kerman	40,000
Ispahan	60,000	Urúmíya	40,000
Mashad	50,000	Shiraz	30,000

ANNUAL TRADE (*in pounds sterling*).

(*Return of the Ports on the Persian Gulf only, for* 1896).

Imports	1,720,000
Exports	1,186,000

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II.—AFGHANISTAN

By Sir George Scott Robertson, K.C.S.I., M.P.,
Formerly British Agent at Gilgit.

Position and Characteristics.—Afghanistan, literally the lan the Afghan, but actually the territory ruled over by Habibula Khan Amir of Kabul, is the most eastern part of the great Iran plateau w spreads south-westward from the Pamirs. It may be described general a drab-coloured land, one of the waste places of the world. Sand, rocks, sterile hills and vast snow-topped mountain ranges are the features of the stern inhospitable country; tender green places, fe irrigated fields, vineyards and orchards being circumscribed and i quent. In summer it is hot everywhere. The temperature depends elevation, not upon latitude. Stony, treeless slopes, parched soil whirling sand increase the heat and dryness of the harsh, scorching Burnt grey-brown, the naked landscape quivers in the fierce beams o sun. Winter brings frost, snow and blustering storms, and in places dangerous snow hurricanes occur; Ghazni is said to have depopulated twice by blizzards. The winter is full of surprises. moment a traveller may, in the Sun's glare, be miserably overheated next, in shadow, he is pierced to the heart by the chill of an icy wind.

Roads are mostly rough and hilly or ankle-deep in yielding sand; are often incredibly tiring. Food is scarce, for the whole count poor; it yields grudgingly bread for man and herbage for animals.

People and Government.—The people, products of this unki soil, are hardy (the weaklings die), stubborn, brave, and so treacherous the word gains an intensive meaning when applied to them. Tow strangers they are servile or hectoring, the probable result in pers financial profit being the sole rule of conduct. Luxury, even comfo them is often what we call vice. Ingenious in sensuality, they are intrig by instinct, while running through their whole character there wonderful arrogance, vindictiveness and cruelty. Born and bred an an unceasing struggle with nature for the means of life, they live hard they die hard. In spite of the rigid, stern and narrow ceremonialis their Mohammedan religion, Afghans are not fanatical; most creeds tolerated, the chief exception being Christianity. Hatred of Chris springs less from questions of dogma and faith than because the bloo ancestors and tribesmen cries for vengeance; and because of the supp determination of the British Christians to enslave the Afghan people force them to "carry loads." Unlike the grasp of an Amir, which and again seizes upon an individual while the crowd escapes, British is feared as a wrought-iron system regulated by an inexorable screw c "law," which squeezes free hill-men into the pulp of which slaves made. The government of the country is an extreme Eastern Absolu

herever or whenever the different tribes are cowed. Regular authority based upon the dumb terror inspired by hideous and dramatic punishents. Tribute is oftentimes collected by armed forces after much blooded. An Amir of Afghanistan must be merciless, and his people must lieve him to be the implacable enemy, secret or declared, of the governent of India.

Boundaries.—The peculiar position of Afghanistan, a buffer State ng between the Russian and Indian empires, gives special importance to boundaries, which have been settled by treaty and delimited on the ound in a highly technical manner. All along its northern border from lfikar on the Hari-rud to Wakhi-jui, where the Sirikol, the Hindu Kush d the Karakoram mountains meet together, the Amir of Kabul's territory arches with that dominated by Russia; while on the west the Persian ovince of Khorasan is profoundly influenced by the officers of the Tsar. erat, one of the most blood-drenched places in the East (Jenghiz Khan t but forty alive out of a population of a million in 1232), whose history the history of Central Asia, has been brought within 95 miles of the ssian terminus by the completion of the Kushk river railway. On the ojected East Persian railway from Ashabad on the Russian Trans-Caspian c to the Persian Gulf two stations will be at most four days' journey from erat. As the nearest British outpost, at New Chaman, is hundreds of les away, this "Key of India," if Herat ever deserved that title, is lost. it in any case it is an ancient and corroded key, useless for the modern el wards placed in the door-lock at Quetta.

The territory east of Badakhshan and north of the Hindu Kush was rmerly the cause of bitter controversy, but since the Russo-Afghan ntier line was laid down in 1894, it has returned to its natural state of owsy remoteness. The northern border of Afghanistan from Persia in ° 20′ E. to Chinese Turkestan in 74° 50′, runs jaggedly side by side with ssian territory for 1,000 miles. Zulfikar is in 35° 35′ N., and from that int the line in irregular loops gains the Oxus at Kamiab, which is more an 300 miles from Herat. The frontier then runs up the historic river d its main feeder, the Ab-i-Panja, to Lake Victoria. Its farthest north int is at the top of the Oxus curve (38° 35′ N.) caused by the northward rust of the great spurs of the Hindu Kush; its most southerly is opposite itral where barely ten miles of mountain land divides Russian from itish authority. Some 60 miles eastward of Lake Victoria this longetched northern boundary ends at a peak in the Sirikol range, which ided the Chinese from the Little Pamir and not far from Wakhi-jui, the ning place of mountains.

The south of Afghanistan is bordered by tracts controlled actually or minally by the government of India. The boundary should be drawn crimson, for blood has been lavishly shed to mark it out. From the ikol mountains the wavy line keeps a south-westerly course for 900 les, until at a spot south-west of Quetta (29° 50′ N.) it alters to nearly due

west, being carried across the great arid desert common to south Afghanistan and western Baluchistan. At first this boundary follows crest of the Hindu Kush as far as the lofty Dorah and Mandal Pa leading to Chitral and Kafiristan respectively. It then runs along eastern watershed of the Bashgul valley of Kafiristan which separates country from Chitral. Passing over the Chitral river just below the vil of Arnawi, and, still upon a mountain range, the line borders the Ku valley on the east, and crosses the main road between India and Ka west of the Khaiber Pass nearly 40 miles from Peshawar. Next, by the of the Safed Koh mountains, it forms a western triangular out-thrust bring the Kuram valley into British territory. Thence the frontier ma traverse the territory of wild tribesmen more than 100 miles west of Indus, and at the latitude of the British frontier outpost of New Cham which is half-way between Qu and Kandahar, that distance doubled. From the Quetta dist the remainder of the south boundary towards Baluchistan over desolate wastes of sand, some distance parallel to the H mand, the only considerable r of its latitude between the Ti and the Indus. The western Persian frontier, about 450 m long, starts in 60° 50′ E., and a running through the great Seis swamps, where the Helmand ri ignominiously terminates, it tu northward again, and with li further variation limits Pers Khorasan and passes with Hari-rud river to Zulfikar.

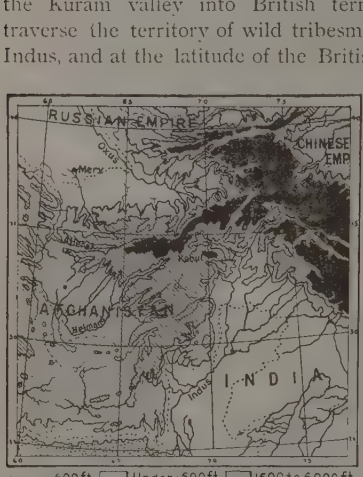

FIG. 242.—*Configuration of Afghanistan and the Pamirs.*

Surface and Communications.—The lowest elevations to be sho in an orographical map of Afghanistan as under 4,000 feet would be Kabul valley at and below Jelalabad, and all the country south and w of a line drawn between New Chaman and Herat; the highest parts (o 7,000 feet) of the Afghan plateau are great tracts just west of Kabul a south of Ghazni. Far from the sea, Afghanistan is difficult to ent where huge mountain chains and toilsome passes do not hinder traveller, there appears heartbreaking sand which, in the south-west the country, is swept during summer by a deadly hot wind. Two of chief trade roads are those from Mashad and from Bokhara to Herat, centre of a well irrigated and richly cultivated district, which is connec with fanatical, unruly Kandahar by a main highway of commerce touch at Farra and crossing the Helmand river at Girishk. There is tra

veen Bokhara and Kabul by way of Balkh (Bactria, the mother of s) and by Khulm. Chief of all the caravan routes is the grim Khaiber , naked and savage, two marches west of Peshawar, the terminus of Indian railway system, and a famous bazár for Central Asian fabrics. historic pass has resounded to the clangour of every great invasion of a, except that of Alexander, who passed it to the north, until the West its stubborn warriors up from the sea. It is held by sections of the dis who have blackmailed every Indian dynasty for centuries. They odically exact a tribute of slaughter from the Indian government in tion to the customary tale of isolated murders; but the passionless p of British authority is closing upon them inexorably. *Kabul*, a owful name to the British, 190 miles west of Peshawar, stands on the ul river nearly 6,000 feet above the sea. There lives the despotic r; its narrow winding streets are blocked with the picturesque *kafilas* Oriental merchants. It has modern arsenals and a gun factory; but all hanistan is of political rather than of commercial interest. The Gomal , the main traffic road between the Panjab and Ghazni, is held on both s by ruffianly Waziris. To it the merchant adventurers from near zni fight their way annually, then lay down their arms and trade ceably in India, to return and resume their weapons and fight their way ne again before the end of the year. Still further south is the Bolan , through which the railway runs to Quetta and New Chaman. New man, the furthest British military post, is about the same distance from dahar (80 miles) as the Russians are at present from Herat. A er's road leads down the Helmand valley to Persia from *Kandahar*, uare walled city with a history remarkable, even in Afghanistan, for ed and strife. Thither all western roads lead, making it hardly less ortant as a guardian of commerce than it is as a strategic fortress.

Tribes.—The Afghan State comprises tribes great and small, mixed odd fragments of peoples, the whole loosely held together as a entless Afghan field-wall is held together, wonderfully but precariously. comes the great dominant tribe of the *Duranis*. Next, the ferocious *zais*, a Turki people with traditions of past ascendancy, who exter- ated the British force retreating from Kabul in 1842. Then follow *aks* and *Hazaras* of Tatar blood, Iranian *Tajiks*, *Hindkis*, *Fats* and the ed folk of the towns. The *Usbeks* of Afghan Turkestan were not one ple, but a confederation of numerous Turk and Tatar tribes. Less erous are *Persians*, transplanted from their native land in the eighteenth tury, *Arabs*, *Jews* and derelicts. Finally come the *Kafirs*, the interest- non-Moslem people of the Hindu Kush who, after centuries of savage dom, were subjugated by the Amir of Kabul in 1895. They are ably the descendants of tribal fugitives from eastern Afghanistan, ed forth, like sparks from the anvil, by the fervid swordsmen of Islam t hundred years ago. Descending, no doubt calamitously, upon the le folk inhabiting the trackless slopes and perilous valleys of modern

Kafiristan—themselves possibly prehistoric refugees before a str
people—these fugitive pagans, aided by the terrible difficulties of
country, maintained themselves in a state of chaotic independence a
all the fanatical crusades of the surrounding Mohammedans, until A
Rahman, the great king of the Afghans, brought them under his
discipline.

The statistics of Afghanistan are mere guesses, as no accurate s
has been made, nor any attempt at a census.

STATISTICS.

(Approximate Estimates.)

Area of Afghanistan (in square miles)		250,00
Population		4,000,00
Density of population per square mile		1
Population of Kabul		140,00
" Kandahar		15,000 to 100,00
" Herat		12,00
" Ghazni		3,000 to 10,00

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CHAPTER XXVI.—INDIA AND CEYLON

I.—THE EMPIRE OF INDIA

By Sir Athelstan Baines, C.S.I.

Name.—The earliest people of whose migration into the country
are now in the habit of calling India we have any historical
owledge entered by the north-west, and gave the name of *Sindhu*, the
ood" or "ocean," to the first great river which obstructed their south-
rd progress. In the mouth of the Irán, or Persians, their kinsmen and
als, the initial *S* was softened into *H*, and the Greeks, who became
quainted with the country through the Persians, dropped, in their turn,
aspirate, calling the frontier river the Indus, and the country beyond
India. Their example was followed by the early geographers and
vellers of the West, and from them the name has descended to our day.
as never been recognised, however, by the inhabitants of the country
lf, who continue to make use of their various racial and topical terms,
tricting the modern Persian *Hindustan* to a comparatively small tract
he north-west of what Europeans know as India. The later and more
nprehensive title, accordingly, may be taken as connecting the sphere
British rule, by which a mere geographical expression has been
verted into a definite political unit.

Position and Extent.—India extends from Mekran, in the west, to
Mekong in the east; from Cape Comorin, in the south, to Kashmir
the foot of the Pamirs in the north. By latitude it would stretch from
iers to the Gold Coast, or from Venezuela to North Carolina, whilst
n west to east it extends over nearly forty degrees of longitude. It
be roughly described as a triangular peninsula, lying almost wholly
in the tropic of Cancer, surmounted by a larger continental region,
considerable extensions east and west, beyond the base of the
insula. The coast-line of the latter, in spite of its length, is singularly
oid of indentations, except at the mouths of the larger rivers and
rds the northern portion of the west coast. The only harbours
rdingly, except for light-draft vessels, are found a little way up the
s of the chief rivers, or where, as at Bombay, a group of islands
ds adequate shelter from the open sea. The eastern coast, in par-
ar, is provided with little more than a few imperfectly protected
steads. The southern portion of the west coast is distinguished by a
s of backwaters, or lagoons, parallel with the coast, and affording a
and convenient waterway for small vessels, when the season of high
s makes the ocean unnavigable.

The Himalaya.—Although India is so sparingly provided
natural facilities for maritime commerce, it is remarkable that fro
earliest times of which we have records, all peaceful intercourse be
that country and the rest of the civilised world has been by sea, v
with the single exception of the British occupation, which was th
naval supremacy, all hostile invasions have been by land; and th
spite of the immense mountain barrier on the north, which const
the principal feature in the configuration of India. This mountain sy
cannot accurately be termed a chain, consisting as it does of se
parallel and converging ranges, intersected by enormous valleys
extensive tablelands. The nucleus of the system is situated just be
the Indian frontier, in the region known as the Pamirs, or locally, a
"roof of the world."

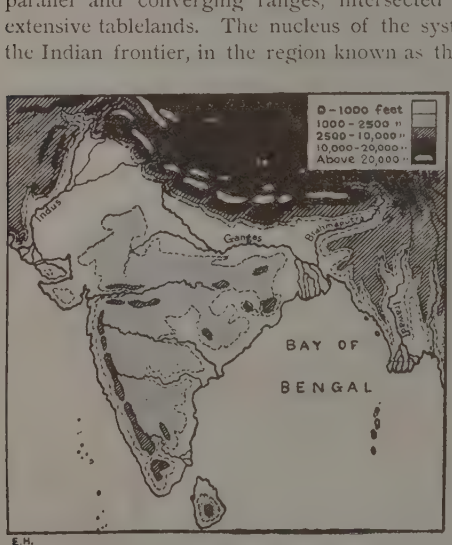


FIG. 243.—*Configuration of India.*

this centre to the
land round the so
of the Irawadi, in
east, an unbroken w
mountains extends
the north of India, pi
only by passes from 1
to 19,000 feet above
sea, overtowered by
reaching an elevatio
from 23,000 to 29,000
The latter is the c
nating point of the E
surface at present a
tained by scientific m
The Himalaya thus
stitutes a continuous
which, if transporte
Europe, would link C
Idris with the Caucasus. Flanking ranges are thrown out from the
mass into Burma on the east, and Afghanistan on the west (Fig. 242).
are of comparatively small elevation, however, and are traversed by
passes, presenting no insuperable obstacles to traffic. It is through
cracks in her armour that India has been from time immemorial subje
invasion from the north-west, and Burma from the north. This ra
is also of physical importance to India, for it exercises a powerful influ
on the climate and rainfall.

The Plains.—Immediately below the Himalaya lie the plains o
great rivers of India, the course of which determined, in prehistoric t
the direction of the earliest civilisation from west-central Asia, as to w
we have still only the shadowy and mythological traditions of Brahm
writings to inform us. Of these rivers, two main streams and two affl

e their rise to the north of the Himalaya, and all four, strangely enough, m within a comparatively small lacustrine district between the main ge of the Himalaya and the tableland of Tibet. The *Indus*, after a rth-western course, bursts through the mountains at an acute angle, lects in a deep and rapid stream the tributaries which give their name the Panjab, or "land of the five rivers," and ends by performing for the at province of Sindh, so called from its chief feature, the office which ypt owes to the Nile. The *Satlaj*, rising south of the Indus, joins the er, after a very short course to the north of the Himalaya, and a long through the Panjab. Starting due east from its source, the *Sanpu* ers Assam, at the extreme north-east of India proper, bends sharply th and west until free from the mountains, and finally, under the name the *Brahmaputra*, mingles its turbid waters with those of the Ganges he innumerable channels of the great Bengal delta. The third great r alone rises south of the Himalaya, and though popular tradition and ctice must be accepted, and the stream of the combined *Jamna* and *ges* be held to be the main contributary to the sacred river known by latter name, it appears that the volume of the tributary which rises on north of the range, known as the *Ghogra*, entitles it to that honour. e richness of the two great rivers, the Ganges and the Brahmaputra, in tilising silt, is the making of lower Bengal, and the amount deposited ry year is estimated at not less than 40,000 million cubic feet, enabling cultivator to dispense with manure of any sort over the inundated area. ilarly, Sindh and the north-west of India are the gift of the Indus, for, ugh the inundation fertilises only the lower part of its course, the canals ich take off from the upper, render cultivation possible where rain is sparse to be of material aid to it.

The Vindhyas and the Dekkan.—The great plains are separated n the rest of India by a belt of hilly, rather than mountainous, country, ning, at different elevations, from coast to coast. The country rises vly from the Gangetic valley to the plateaux of Central India, edged the *Vindhya range*, below which, on the south, the *Narbada* river seeks Gulf of Cambay. Parallel to that range runs the *Satpura range*, similarly nded by the valley of the *Tapti*. Eastwards the country is more ken, the plateaux smaller, and the wide but irregular belt of hills ends he neighbourhood of the Bay of Bengal, after giving birth to only one r of considerable size, the *Mahanadi*. On the west, the large plain lmost rainless country called the Indian desert, divides the tablelands Central India from the valley of the Indus and the small peninsulas of bh and Kathiawar.

The core of the peninsula proper is the Dekkan Plateau. This may aid to begin from the southern edge of the Tapti valley. Its limits well defined on the west by the range called the Sahyadri, or *Ghats* s), from their abrupt rise out of the strip of coastal plain, which nds, with varying breadth, to the extreme south of Malabar. In like

manner, the plateau ends abruptly in the south in the mass of the *Ni*
or Blue Mountains. The surface slopes gradually from the top o
Ghats to the eastward, and finally subsides into the flat coast of the B
Bengal. A broken line of hilly country runs parallel with the coast
the Central Belt southwards, to which the name of the *Eastern Gha*
sometimes given, though it possesses none of the special features o
western system bearing that title. The Dekkan is traversed by
principal rivers, the *Godavari* and the *Krishna*, rising in the Ghats
falling into the Bay of Bengal. To the southward the *Kavari* seeks th
after a short passage through the southern portion of Mysore and sou
Madras. No stream of importance enters the Indian Ocean south o
Tapti, and the almost unbroken chain of the Ghats makes the uplan
the Dekkan difficult of access from the coast, except by a few p
through which roads have been made by the British. The s
east of the peninsula, on the other hand, is a comparatively
plain, of great fertility everywhere within range of the waters of the
deltas

Burma.—Finally, the province of Burma consists, first, of the coas
from Arakan to Tenasserim, broken only by the delta of the Irawadi an
bay formed by the mouth of the Salwin river. North and east of
Irawadi the country is hilly and thickly covered with forest as far a
borders of Assam and Bengal on the west, and the frontier of China
Siam on the north and east. The *Irawadi* attracts the population
commerce of central and upper Burma, leaving a fringe of semi-civi
tribes on each side.

Geology.—The geology of India determines the general character
of the main divisions specified above. So far as the *Himalaya* have
explored, they appear to contain three systems, chiefly of gneiss m
with mica-schist in the more northern portion, and with syenite
granite in two bands in the central range. In the lower ranges to
south, the beds are often found inverted, with old gneiss overlying
mentary rock. The sub-Himalayan system of later Tertiary, include
Siwalik formations, well known for their remarkable deposits of
mammals. In the Salt range of the western Panjab, which is in
respects a continuation of this region, a uniform succession of forma
from Silurian downwards is found. The two great river-systems o
Indus and the Ganges are separated by no marked ranges, and the
from the sea-level to the watershed is very gradual, a slight chang
elevation would suffice to turn the upper waters of one into the o
Such changes have probably occurred in times past. The *Plain*
whole, belongs apparently to the Eocene period, antecedent, therefor
the formation of the Himalaya, which was upheaved in later Ter
times. The close resemblance, however, in the outline of these
geographical features, seems to indicate that the depression of
plain is related to the upheaval of the mountains. The *Central Be*

y country shows three systems of gneiss, overlaid with transitional k succeeded by the Palæozoic, possibly pre-Silurian, formation of upper and lower Vindhya, from which the older rock is sharply narcated towards the east, but less well defined westwards. The dstone and shale of this formation is remarkable for its entire freedom n fossils. On the other hand, the Gondwana series eastward and thward of the Vindhya, contains vegetable remains of considerable erest and value, while the portion towards Bengal ends in the coal-ring strata known as the Damodar series. The series is interesting, from its containing marks of glacial action, which one would not ect to find at comparatively low elevations within the tropics. The ater part of the *Dekkan* is occupied by the basaltic formation of the taceous period, known as the Dekkan Trap, some of which is more n 6,000 feet thick. The denuded edges of the flows form some of the st prominent hill ranges, and the scarped tops have been, from time nemorial, utilised, with the aid of a few wings and flanking walls, as ts of vast extent, and, in the days of short-range artillery, of no incon-erable strength. The disintegrated basalt, weathered out, forms the tile black soil to which the Dekkan owes its repute, in parts, as a cotton l wheat-growing tract. From the point where the Ghats approach the , on the west, the basalt is fringed, and in some places overlaid, by rite, and the same feature is found also along the greater part of the t-coast, south of the Mahanadi delta.

In *Burma*, the early Tertiary prevails in Arakan, or along the northern st. Between the Irawadi and the Sittang rivers the formation changes Miocene, with fossil vegetation of probably the Pliocene or newer tiary, in the western portion of that tract. Tenasserim differs from the of Burma in its formations. In the north is the lower Carboniferous ; he centre, Silurian ; and in the south, probably Tertiary, and also coal-ring.

Minerals.—The mineral resources of India, although of little im-ance in comparison with those above ground, are not scanty. Coal ts in large fields in the Damodar valley of western Bengal, where s in good demand for the railway ; in the Narbada valley it is g worked for local use ; there are fields too in the hilly country Chutia Nagpur, south of the Ganges valley, which have not yet t fully explored, and finally, attention has been directed to a supply he South Godavari valley. Beyond this, the peninsula is coalless. ll fields of excellent quality, however, have been lately discovered and ed in the far north-east of Assam. Iron is found in considerable y in the coal-bearing tracts of Bengal, and near Salem in the Madras idency, but it is little worked because of the want of limestone within range for smelting. Gold exists in small quantities in the valleys e Himalaya and the Central Belt, where it is washed by a few of the st classes. In Mysore it is more plentiful. Tin is confined to the

south of Burma, and copper and lead chiefly to the Himalaya. The p
of North Bihar yield a good deal of saltpetre. Salt is both dug from
rock in the western Panjab, and obta
by evaporation along the coasts and
the brine lakes in Rajputana. Rubie
still found in a small tract in Upper Bu
but the diamond of India, though know
legend, is now scarcely extant. Petrol
the use of which for lighting and lubric
has largely increased in India during
last twenty years, is found chiefly in Bu
upper Assam, and parts of the Panjab
does not yet compete successfully with
imported supply.

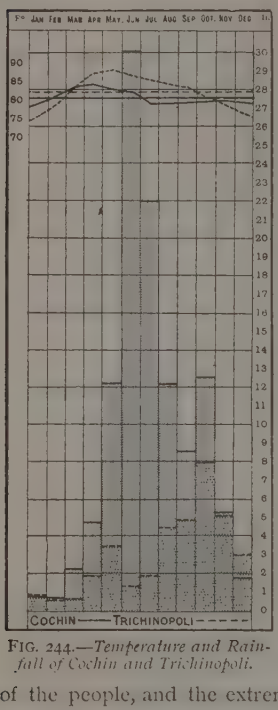


FIG. 244.—*Temperature and Rainfall of Cochin and Trichinopoli.*

Climate.—The peninsula lies w
south of the tropic, whilst the contin
portion of India stretches nearly 14° t
north of it. The range of temperatu
accordingly very wide. (See isotherm
Asia, Figs. 228, 229, 230.) Along the c
it is high but equable throughout the
and the air is charged with moisture. In
the plateaux show a wider annual ra
and are dry and hot during one part o
year, dry and cold during another, w
comparatively short interval of warm
weather. Except along the coasts, there
the mean annual temperature is a met
logical figure of little significance in th
of the people, and the extreme range between the mean of the war
and of the coolest month is a factor of
importance. This range, in upper Sindh, is
as great as 30° F. in the year; in the Panjab,
27°, and in the Dekkan, 25°; whilst in Cal-
cutta it is but 16°, falling along the west
coast to 12°. The variations in the annual
rainfall are still more remarkable. Through-
out India the fall is periodic, and the
prevailing influence is the air-current, or
monsoon, which sets in from the Indian
Ocean about May, lasting until the middle
or end of September. The direction of this
air-current, determined by the updraught
caused by the heated surface of the con-
tinent, is from the south-west. Its strength appears to depend t

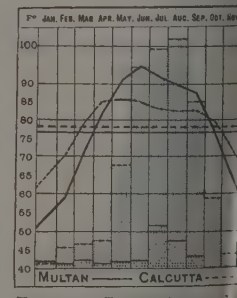


FIG. 245.—*Temperature and fall of Multan and Calcu*

nsiderable extent upon the snowfall upon the immense mountain system the north, the cooling influence of the heavy fall tending to weaken e force of the moisture-bearing nd as it approaches the wall of e Himalaya, which bars its further ogress. Before reaching this, wever, it has to encounter the rious resistance of the Ghats, rectly across its main direction, priving it of a considerable pro-rtion of its moisture in favour of e coast strip, to the detriment of e highland of the Dekkan imme-ately to the east of the impedi-ent. Access to the plains of the uthern part of the Gangetic sys-n is afforded by the wide valleys the Tapti and Narbada, and the in air-current, which does not ich the plains of north-western India direct, is deflected and condensed its attempt to surmount the almost vertical expanse of from 5,000 to ,000 feet of perennial snow presented by the Himalaya. A second nch of the same air-current, however, finds its way up the Bay of ngal, and, after bestowing a plentiful watering to the low-lying fields the great Delta, and on the plains of Lower Burma, meets the Assam nge of mountains in full force, resulting in an annual fall of little less than 500 inches, and establishing on one occasion the "record" fall of 805 inches. Later in the year a sort of reaction sets in, and this part of India receives the downfall of a north-eastern air-current, which extends along the east coast nearly to Cape Comorin, supplying the deficiency left by the exhaustion of the south-western monsoon in its course over the Dekkan plateau. In the north-western corner, again, the same result follows in the winter months over the Panjab and the upper Jamna and Ganges valleys, but the air-current is slight and local. Thus the central plains of continental and peninsular India lie on the edge of the air-currents, are liable, accordingly to receive too little rain whenever any of the

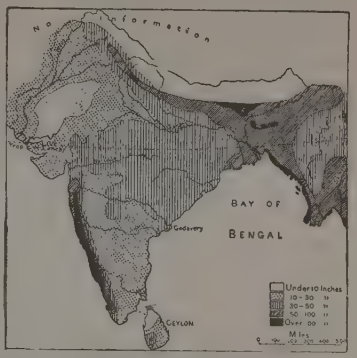
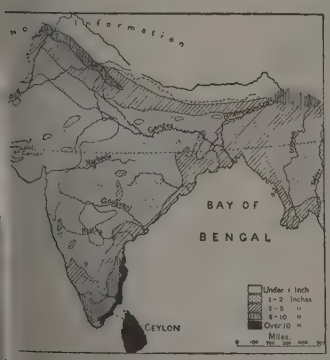


FIG. 246.—*Rainfall of India during South-West Monsoon.*



247.—*Rainfall of India during North-East Monsoon.*

winds is of less than the average strength. To these tracts the n
of Zones of Uncertain Rainfall is given, and it is here that the liab
to famine is most marked. In contrast to the meteorological condit
prevailing in north-eastern India, the western portion of the contine
division of the country is all but rainless, and cultivation has to dep
entirely upon artificial irrigation beyond the reach of the annual inunda
of the Indus, due to the melting of the snow on the Himalayan source
the main stream and its large tributaries. Thus, the annual rang
temperature varies inversely as the rainfall, and the two together exer
an important influence on the general social and economical developn
of the population.

Flora.—The exceptional power of this climatic influence in I
depends on the fact that the natural resources are principally on
surface of the soil, and to a comparatively small degree in its dep
From the earliest ages, agriculture has been the hereditary and traditi
occupation of the great bulk of the population, and at the present
about three-fourths of the inhabitants of India are directly dependent u
it. To provide for the subsistence of nearly three hundred millions, al
more fertile plains and much of the less favoured tracts have been grad
pressed into the service of man. The forest wealth, accordingly, whi
considerable, has been gradually restricted to the broken and hilly gr
in Central India, along the chief mountain ranges, and in the river va
of Burma. There the more valuable timber-producing tracts have
taken under the protection of the State and administered as profit-yiel
estates. Elsewhere, with due regard to the demands of the populatio
coarse timber and firewood, as well as to the climatic influence attrib
to forests, areas under vegetation are protected against the rec
destruction habitually wrought by the Indian peasantry. Of the timb
India the most widely used is the teak (*Tectona grandis*), the best of w
is found in the forests of Lower Burma and along the Ghats, from Ka
to Travancore. It flourishes, too, though on a smaller scale, throug
the western portion of the Central Belt of hills. Along with the teak
be mentioned the sandal and blackwood (*Sissu Dalbergia*), more usef
ornamental work than as timber, but in their way, of equal value.
place of the teak is taken in the east of the Central Belt and along
northern parts of the Gangetic valley, by the sal (*Shorea robusta*); in
Himalaya, by the deodar and other cedars; and in the western range
conifers of larger growth. Various kinds of oak also flourish at eleva
over 5,000 feet from the Panjab to Bhutan. In the dry tracts of the
little but a few varieties of hardy acacia and tamarisk can withstand
long periods of drought. The marshy region of the Gangetic delta, o
other hand, has developed its own growth in sufficient luxuriance
supply the markets of all the adjacent country, as well as the metro
Midway between the extremes, the forests of Assam and Malabar pr
typical pictures of the rich and varied vegetation generally associated

e tropics. There are three kinds of tree which, though useless as timber, e more widely distributed than any of the above, and of incalculable pular utility. First, the bamboo, which attains its largest growth in the mp forests of Assam, Burma, and the Ghats, but which is seen to some ent even in the upland regions. Secondly, the mango, the most popular it tree of the country, and finally, the large and varied class of lms, including the coco-nut, which fringes the western coast from mbay to the southern point of Ceylon, the palmyra of the more rtherly tracts of fairly heavy rainfall, and the various date and other lms of the dry tablelands and the upper Ganges valley. In some tracts e house and nearly every domestic utensil is made of bamboo. In iers several of the lower labouring classes trust largely to the fruit the mango for food between the harvests. The palm tribe supplies tting from its crown of branches, fruit from the coco-nut, fibre for its and ropes from the husk. The palmyra provides an effective thatch inst the heavy rain, whilst nearly every palm supplies a plentiful out- uring of juice, used fresh, as a morning stimulant, or fermented, as an ening consolation.

Animals.—Of the animals of India, the first place must be given to rned cattle. Except in the desert and Sindh, where the camel pre- minates, and in the damp climate of the deltas and parts of the coast, iere the buffalo thrives, all field operations requiring draught labour, d the whole of the transport by road are done by the various breeds of mped cattle ; and milk being one of the most important articles in the t of an otherwise almost vegetarian peasantry, the cow is seldom absent m even the poorest household, and is well entitled to rank as the sacred imal of the Brahmanic religion. The horse is found in general use, though riding only, in the west of the continental part of India, in the Dekkan, d in Burma and its neighbourhood. A very fine breed of the wild ass is still ant on the salt plains of western India, though in very small numbers, d the domesticated variety, though numerous enough, is relegated to the mblest duties, and shows no sign of rising in either breed or estimation. e sheep is kept chiefly for its wool, and the most prevalent variety is obably of foreign origin. In the Himalaya alone wild species of eat size and remarkable spread of horn are found, affording much labour d interest to adventurous sportsmen. The elephant is found wild in the ls of the north-east, and in parts of the forest land of the south-western ats. It can now only be caught under the license of the State, and, cept for purposes of pageant at the courts of native chiefs, its use is ncipally confined to draught and transport in military operations. In forest tracts of Burma, however, and in Assam, it is almost a domestic mal.

Of the purely wild animals of India, the tiger is the best known, and found in most wooded tracts, though in greatest abundance in the -Himalayan forests, the marshes of the Gangetic delta, and the hill

country of Central India. With its smaller but more plentiful relat
the panther, it is responsible for the death of about 1,200 human bei
and over 60,000 cattle per annum, in the British provinces alone.
various kinds of snakes, viperine and colubrine, kill about 20,000 pers
and 4,000 cattle every year. The lion is now extinct except for
almost maneless variety found in small numbers in the southern hill
the peninsula of Kathiawar. The only small wild animals that need
mentioned are the jackals, because by them, along with their feathe
compeers, the kites and vultures, and their subterranean allies, the termi
erroneously called white ants, the work of the scavenger, which wo
otherwise be left mainly to atmospheric chance, is rapidly and efficie
performed.

Races of People.—In no equal area is there found a population
nearly 300 millions divided to such an extent into distinct and in
pendent communities, owning no brotherhood of religion, langua
race, or social intercourse. A false impression of homogeneity is so
times received by assuming that race in India is co-extensive with cre
and that the titles of Hindu and Musalman, accordingly, denote dist
races. Thus, the three-fourths of the population called "Hindus,"
held to be a solid mass, indigenous to India, while all others
oreign. The term Hindu, however, is not, any more than the w
India, recognised by the people themselves; it is simply a compreh
sive way of grouping the almost innumerable sects and communi
which do not profess a more definite creed, but which have adopte
certain system of social organisation based upon the supremacy o
priestly caste, the Brahmans, and it includes many different races wit
the fold.

The race basis of Indian society is to-day, as it was in the dawn
history, a short, swarthy, and stalwart population, the origin of whic
unknown. Its direct and probably pure-bred descendants live in the h
and forests of Central India, the north-east coast, and among the mo
tains of southern India, under numerous tribal designations, but simila
life, customs, and types of language. Traces of their blood run through
the population of the open country, though disguised by the lapse of m
generations of different physical and economical conditions. The f
dispossession of these dark races of which we have any record, was
some fair-skinned tribe calling themselves by the generic title of *A*
from the west of Central Asia. They occupied the great plains, enslav
the dark races or driving them to the hills. The northern peninsulas
Kachh and Kathiawar, on the west coast, Berar and parts of the Dekkan
well as Orissa, on the east, were also colonised by this race, but it does
appear that they established themselves in force further to the south or e
and in the present day it is only in the upper Ganges valley, in Rajput
and the north-western coast of the peninsula, that a comparatively p
Aryan stock is to be found. Following upon the immigration of the A

ıd within historic times, other races of Central Asia, known to the Greeks Scythians, sweeping down from the north, have left their mark on the ɔpulation of the Panjab and its vicinity. Similarly, the valleys of the ɾahmaputra and Irawadi have respectively been the guiding lines of im-ɨgration from eastern Asia, but the Mongoloid tribes of the north-east d not penetrate as settlers far beyond the outer fringe of the great ains, and found a congenial resting-place in Burma and Siam. The yellow pe, with the obliquely-set eye and high cheekbone, dominates the whole the southern slopes of the Himalaya, as well as the interior of the great ountain system, and has left traces in the population of eastern Bengal. Burma, as in India proper, a squat, dark race has been displaced and iven from the plains to the hills and forests by a northern invader of perior civilisation. All these races profess religions which, whether ɾahmanic, Buddhistic, or of more primitive type, are indigenous to dia. Of the imported forms of faith only the smaller, such as the raelite and the Parsi, are co-extensive with a race distinction, the rest, ch as the Christian and the Musalman, having been chiefly recruited ithin India itself. The *Parsi* community, though spread in small numbers ɾarly all over the country, is mainly domiciled in and to the north of ɔmbay, and numbers but 90,000 souls in the whole empire. Of *Jews* ere are three small communities, two of which have, in course of time similated much native stock. All of these, again, are denizens of the ɛst coast. The 2¼ millions of Christians comprise over two millions of dian converts, of whom 1¼ million are the descendants of those baptized the Portuguese of the 16th century; about 160,000 are Europeans, and e rest of mixed breed. The invasions of Upper India from the north-ɛst have left behind them a fair sprinkling of Afghan and Moghal blood, pecially on the frontier and round the former capital cities of Delhi, ɬhore and Lucknow. But the bulk of the 60 million Musalmans consists local converts from the system loosely known as Hinduism, and the les assumed by many, implying an Arabic or Moghal origin, bear no lation to actual descent.

Languages.—The influences which merged race in race and largely duced religious systems to the semblance of a few uniform creeds have t availed to break down the barrier of diversity of language, which, with ɛ system of caste, keeps apart the chief communities of India. Here, ain, comprehensive classification tends to leave a false impression of iformity. For instance, the group of languages which from their ucture and vocabulary are included under the general title of the nflectional" or Indo-Aryan type, comprises more than three-fourths of ɛ population, but the sixteen or seventeen main items into which the ɔup is subdivided, such as Hindi, Bengali, Marathi, Gujarati, Panjabi, ɾ., represent tongues so different that the communities which use them ɛ unintelligible to each other. It is the same, in a less degree, with ɛ fifth of the population speaking Tamil, Telugu, Kanarese, and other

languages of the Southern, or Dravidian, "agglutinative" type, an a still greater measure with the comparatively small group of the r markedly agglutinative tongues known as the Tibeto-Burman. Spea generally, the last family is restricted to the north-eastern Hima and Burma. The Indo-Aryan family holds the north-west, the g plains, the deltas, and the west. The whole of the south is Dravi whilst between this group and the Aryan comes the small agglutin class of tribal tongues conveniently known as Mundari. Hindi wit dialects is the mother tongue of some 100 millions, Bengali of 45, Te of 20, Marathi of about the same number. Then comes Tamil with Panjabi with 18, Gujarati 9, Kanarese 10, Uriya 9, and Burmese wi millions. The Mundari family is dying out in favour of Hindi, and prevails amongst about 3 millions only.

Political History.—Up to the establishment of British rule history of the country is mainly that of the successive domination of different races or sections of the people over each other, tempered the sometimes short and sharp experiences of foreign invasion from north-west, entailing a reconstruction of the political map with al kaleidoscopic rapidity and completeness. The introduction of the A element at an early period was the result not of invasion, but of gra occupation and expansion, covering many generations, and its social religious system is the product of India itself. The historic acquisitio the Panjab, about 500 B.C., by Darius I. of Persia, and the subseq overrunning of the same tract by Alexander the Great, in 323 B.C., le trace behind them. Shortly after the departure of the Macedonian strong man arose, by name Chandragupta, who laid the foundations, a wards largely extended by Ashoka, his grandson, of an Indian Em The personal element, as in all Asiatic monarchies, was the keysto the edifice, and in a short time the outskirts of the kingdom fell away. more important of the foreign invaders who succeeded were evicted a few generations of power by Indo-Aryan chiefs from the Gan plain, or were gradually absorbed into the Brahmanic system. The s of the peninsula never fell to either Aryan or Scythian domination, bu dark races assimilated the teaching and religion of the higher race, w approached them as missionaries and advisers. The next period of poli importance is that of the invasions of the Musalmans of Afghanistan f the tenth century after Christ. At first little attention was paid to manent occupation. Then, Jenghiz Khan passed, ravaged, and ret Timur did little more, but left a claim which his descendant, Babar, m good, establishing on it the Moghal Empire, which, at its height, exte to the southern limits of the Dekkan. The great administrative abili Akbar, the contemporary of Queen Elizabeth, made the Moghal co effective throughout his domain, but, as in all Oriental rule, the limbs loosely knit to the trunk ; the central power decreased with distance f the Court at Delhi, and the Emperor's deputies one by one asserted i

ndence. Continual religious persecution welded the Sikhs, originally no re than a dissenting sect of Hindus, into a military and political com- nity of the best fighting material in the country, and when a suitable der was found in Ranjit Singh, the Panjab beyond the Satlaj was detached gether from the throne of Delhi. Long before this, however, the rule he Moghal had been almost destroyed by the upheaval of the Maratha e in the western Dekkan. The warlike and predatory instincts of this ple were directed towards a common object by the strong man of the ment, Shiwaji, to whose standard the men of the Ghats and plains e rallied to overrun India from Tanjore to Delhi, and to establish States der their own chieftains from Kathiawar in the west to Orissa in the t. There then set in the old tendency to disintegration. Chief intrigued inst chief, and shifting alliances were formed and broken, reducing the d to chaos. Early in the eighteenth century, the rival local chiefs gan to depend less on combinations amongst themselves than upon co-operation of the English or French settlements on the coasts. The parture of the Europeans from a policy of purely commercial develop- nt to the participation in Indian dynastic struggles was initiated by French; but whilst the hold of that nation on southern India waned, t of the British was gradually extended from the coast into the interior, the Maratha and Moghal authority fell to pieces. From an ally to made use of in local disputes, the British grew to be the arbiters of differences in which those disputes originated, and proceeded to the ition of pacificator general, and, finally, of paramount ruler throughout whole of the peninsula and the greater part of the Ganges valley. It remarkable fact, worth noting in connection with this aspect of the graphy of the country, that with the exception of the chiefs of Rajputana, hiawar, and the Malabar coast, not one of the principal States of India led by a dynasty native to it. It must also be borne in mind that, with same exceptions, most of these States are only the mushroom growth of closing years of the eighteenth century, when the whole of India was onfusion almost amounting to anarchy. Thus, throughout the greater of India, the political history of the last century and a half has been tically that of the replacement of a precarious and recent domination oreign Asiatics by a stronger and more enduring control by foreign peans. Setting aside accretions of territory within the confines of India ver, the British Indian Empire comprises important acquisitions by con- t during the latter part of the nineteenth century, such as the Panjab, h, and the two sections of Burma, while the political, as distinguished the administrative, frontier of India has been extended by negotia- or assertion of a "sphere of influence" over parts of the wild country ne confines of Burma and China, over the frontier of semi-independent tory between India and Afghanistan, and over Baluchistan and the ining Mekran coast. The mutiny of 1857 led to the transfer of the inistration of India from the Honourable East India Company to

the British Crown in 1858, and in 1877 India was declared an Emp

Government.—The link between the authority exercised in Indian Empire and that vested in the Sovereign and the Governmer the United Kingdom is the Secretary of State for India, a member of British Ministry, aided by the Council of India, consisting of civil and mili officers. lawyers and merchants, all having long experience of Indi their different capacities. Whilst exercising a general supervision control over the administration, the Secretary of State is the sole resp sible adviser of the Government of the day on all questions concer India with which that Government is called upon to deal. The ac government of the Dependency is conducted by a Governor-Gen conventionally, though not legally, entitled the Viceroy, who is aided Council of civil and military officials, in Calcutta or Simla. A surviva the time when British power was confined to the peninsular coasts, when communication between distant parts was difficult, is found Madras and Bombay, the heads of which, with their Councils, are appointed, like the Governor-General, directly by British Government. The more recent acquisiti such as the Panjab, the upper Gangetic valley, kn till 1901 as the North-West Provinces—a survival the early days of British rule—recently changed to more appropriate title of the United Provinces (A and Oudh), the newer province of Upper and Lo Burma, together with the older province of Lo Bengal, are under Lieutenant-Governors. The sma divisions of British territory, Assam, the Central P vinces, Coorg, Ajmer and Berar, and the North-West Frontier Provi separated from the Panjab in 1901, are administered by a Chief Comm sioner immediately subordinate to the Central Government. The supr legislative authority is vested in the Governor-General, who, for the p pose of framing laws, appoints, under various systems of nomination election, a number of local advisers from the provinces, as additi members of his Council. For administrative purposes each provinc subdivided into districts of unequal area under a single officer. all there are 250, with a mean area of just under 4,000 square m and an average population of nearly 900,000. The extremes, how range from Simla, with only 100 square miles, to a frontier distric Upper Burma, with 19,000, and from a population of 19,000 on coast of Burma, to one of nearly 4 millions in Maimansingh, near apex of the great Bengal delta. The main feature in the administra is the insignificant proportion borne by the European element to native throughout the far-reaching and elaborate system under wh vast and illiterate population is developing its own civilisation, prote but not directed, by foreign authority. Taking into account the 75

FIG. 248.—*The Star of India, the Badge of the Indian Empire.*

sh troops and all the professional and mercantile population of that , the proportion is one Briton to 3,000 Indians. In the service of the e, irrespective of the 800 British officials occupying the more respon- posts, and the whole of the subordinate staff, which is Indian, no less 97 per cent. are natives of the country. Nearly two-fifths of the tory and just below a quarter of the population is not under direct sh administration, but is ruled by native chiefs, over whom the ernment exercises the authority of a paramount Power only. Speaking rally, the same protection against usurpation or encroachment, and same obligation of loyalty and good government are extended to the of a dozen villages, who happened to be in lawful possession when engagement with the British Government was concluded, as to the of the twelve millions of the State of Haidrabad.

Occupations of the People.—The conditions that make this ecedented system of government both possible and suitable to the try are to be found first in the divergent interests and aspirations of onal rivals, religious and racial, which are repressed by strong and rtial administration, and then in the economic ibution of the population. Not merely is the whelming majority of the masses of India ly agricultural, but by the character of the e of land and of the social system prevailing most of the country, it is also attached in a rkable degree to its birthplace. The bulk of opulation lives in villages, a term which in- s both a collection of dwellings and the land by the inhabitants, each forming an inde- ent community, complete in itself, even to dministration of its own affairs, and providing subsistence for its cultivators and artisans. Throughout nearly the whole country nd is held, either nominally or in practice, by peasant proprietors, all holdings with security of tenure, so far as it is possible for the to secure it. The system of caste restricts in most cases social and rial ambition within very narrow limits, and this, together with the ity of language and climate, tends to make migration to more favoured ies a matter of inconvenience and hardship, rather than of advan- Every circumstance in the village life is discouraging to mobility, ration, or to common interests of a public character. Stationary ts accordingly are the rule, and the mass of the people is engaged ivation, cattle or sheep breeding, fishing, or the like rural occupations, more than 5 per cent. is attracted into aggregates large enough onsidered as towns. Home industries are largely practised, though stom of the craftsman does not usually extend beyond the village to he is affiliated, or its immediate neighbourhood. The tradition of the e work to which Indian art owes its reputation, still survives, but these

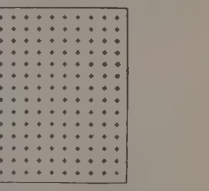


FIG. 249.—*Average population of a square mile of India.*

fine products never entered into the economic life of the masses, and t only upon the fitful and precarious patronage of native courts. The co gation of the workmen into factories is a feature of the present gener and has taken strong root in the cotton industry of the west coast and i of jute in Calcutta and its neighbourhood. Cawnpore, too, in the Ganges valley, is a centre of both cotton and leather work. Among modern industries which have attracted a fair number of the lower c are the tea gardens of Assam, the Nilgiri hills and the sub-Hima region, the indigo works of Behar and Oudh, and the iron-smeltin coal mines of Bengal. Agriculture, however, remains the mainst the country, and the trading classes, spread all over India, rura urban, are chiefly engaged in the collection and distribution of fiel duce, accompanied, in nearly every case, by money-lending, the tradi function of their class in the east.

Trade.—The development of the great seaports has afforded an o tunity to the upper class of traders of which they have been qui availing themselves. Before the British were in power, the foreign e trade of India consisted chiefly of art fabrics or luxuries, valued a more than a million sterling per annum. It has since expanded am the masses in place of the comparatively few, and the peasant profit the handicraftsman. Its annual value, excluding treasure, is now 1,200 millions of rupees, or over 80 millions sterling. The items va proportion, but the average order is as follows: Grain, 180 million r (including rice, chiefly from Burma, 130 millions; and wheat, northern India, about 40 millions); then, raw Cotton, from w India, 140 millions, and Oil Seeds about 170 millions; raw Jute, Bengal, 110 millions; Tea, Opium, hides and skins, some 85 mi each. Indigo has fallen from 53 millions in 1895 to 18 millions in owing to the successful competition of artificial products. Lac and wool follow at an interval which varies considerably from year to The result of the new departure in manufacturing industry is seen increasing export of jute goods now valued at about 80 million rupee of cotton yarn, principally to China, valued at about 50 millions, wit that value in coarse fabrics, popular in East Africa. The import trad relatively outstripped the export, although, owing mainly to the en ment of British capital in industrial and commercial enterprise an necessary liquidation in England of part of the cost of British of and troops, the actual value of the imports is considerably below t the exports. Taking the sixty years ending with 1896, in 1836, the im of merchandise were 30 per cent. of the total and 39 per cent. at the e the period, the rate of increase having been 930 per cent. in the export no less than 1419 in the imports. The latter consist largely of cotto woollen piece goods, metal and hardware, machinery, railway plant luxuries such as silk and sugar, with a rapidly increasing deman mineral oil, European clothing, and a fairly constant market for British

Communications.—In former days, owing to the want of protection the heavy and frequent transit duties levied by each State on goods ely passing through it, but little use was made of the seaports by the nd countries. The improved roads are now freely used, and the great rways of the Ganges, Brahmaputra and Irawadi, and, to a less nt, the lower Indus, are crowded at certain seasons with small craft ng between the coast and the interior. Trunk roads connect all the cipal towns, and in the Gangetic valley, Orissa, and further south on the coast, canals have been opened to aid local traffic. Thus, for short dis- es of two or even three hundred miles, the traditional modes of transport, oat, cart, or pack animal, still hold their own. The most important ge in trade, however, has been wrought by the development of ays, introduced in 1854. At first trunk lines were constructed, partly nnect the four or five chief s, partly, also, for strategic oses. Branch and chord followed, first for trade oses, and then, again, to g grain within reach of the s liable to failure of harvest n the rainfall was unpro- us. The general scheme now been nearly com- d, except in Burma, m and Sindh, where links considerable length are under construction. The age open for traffic in h, 1901, was 25,035. number of men em- d in 1897 was 283,000, hom 4,660 were British. as once held that for traffic in thinly peopled cts, or where the ex- of produce are not to be heavy, or con-

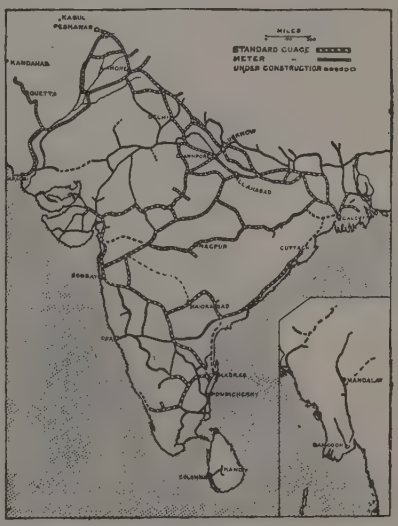


FIG. 250.—*The Railways of India and Ceylon.*

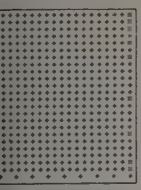
ated into a few months of the year, a narrow gauge, lighter and er than the standard, would be sufficient ; certain spheres or tracts accordingly assigned to be served by the narrow gauge, whilst the arteries of foreign commerce, ending at the principal seaports, are e broader gauge. The development of through traffic, however, has the linking up of several of the narrow-gauge systems, and in spite of convenience and expense of transferring goods, at the junctions with her lines, the use made of the lighter system is growing with the rest.

Finally, whilst the course of the Ganges and Indus is closely followe various lines of rail, the same rivalry does not yet exist in the case o Brahmaputra and Irawadi, on each of which, accordingly, passenger goods steam-vessels ply throughout the year for many hundred miles. larly, the rugged coast between Bombay and Goa precludes access o wise than by coasting steamer. Orissa, till recently in the same inconve position, has now a railway approaching completion which crosse swamps which formerly interrupted its land communication with Cal

Political Divisions.—To understand the political subdivisio India, one must remember that the Empire has been built up by succe accretions, and that in all territorial demarcation the independent ence of numerous protected States scattered over the country had regarded. The boundaries, therefore, are not necessarily in accord with physical or linguistic distinctions, nor are they always suc would be the most convenient in the present day. Of late years, ever, changes have been made for administrative purposes, bringing various charges more into harmony with modern conditions. The sp features of urban development in the Indian Empire must also be into account. The natural resources of the country not being such attract people into large aggregates for industrial purposes, and, within the last century or so, no tendency having existed towards fo trade, the towns of India had almost all a political origin and develop The chief gathered together his forces in the situation most conve for defence, and walled them in with the same object, includin the civil population necessary for their subsistence and comfort. position was, therefore, usually on a hill or river. Occasionall the arbitrary command of the chief, the site was changed, and whole nucleus of the town transported to a distance. Under Moghal rule, the main conditions were the same, though the estab ment was somewhat more enduring. The life of the place w and waned with the fortunes of the chief, and we thus find in diff parts of the country vast areas covered with ruins, and large cities state of decay, due to the supersession or fall of their patron. But w the chief is still in power, the old conditions are maintained, improve participation in the modern advantages introduced under British aus Irrespective of these last, the most progressive cities of India are, first seaports established under British rule, then the smaller towns which profited by their position as railway centres, and, again, those which been selected for military stations. The present tendency seems to b a town to decay in proportion to its detachment from the modern or mercial element in its life, and to rise where it shows a spirit of adapta

Bengal, with a population of 74,745,000 under British administra and 3,700,000 under petty chiefs, contains four well-defined reg (1) *Bengal* proper consisting of the Delta and the low-lying land east north of it, separated by hill ranges from Burma and Assam. (2

ely peopled plain of *Bihar* to the north-west, between the sub-alayan forests of Nipal and the Central Belt of hills which divide it the valley of the Mahanadi. (3) The northern section of that belt, vn as *Chutia Nagpur*, a region of forest and tableland, held chiefly by descendants of the dark races. (4) *Orissa*, a country of low coast backed by forest-clad hills. Politically the old presidency was divided in 1905 into *Bengal* and *Eastern Bengal and Assam*.



251.—*Average population of a square mile Lower Bengal.*

Nearly the whole of Bengal may be said to be very fertile; and, though parts of Bihar lie within the zone of uncertain rainfall, the density of population throughout the province averages nearly 500 per square mile. Except in the dryer tract of northern Bihar, rice is by far the predominant crop. The poppy is grown for the preparation pium in the same tracts as wheat and indigo, and jute is a favourite le in the north and east. The economic position of the province of gal differs from that of most of the rest of India in the existence of ge class of landlords, the creation of the early British administration, rvening between the cultivator and the State, who hold their estates quit-rent fixed at the end of the eighteenth century, when the land ed both labour and security of possession. The linguistic distinc- s of Bengali, Uriya, and Hindi, together with the large Musalman ent in Bihar and eastern Bengal, and the centralisation of business and essional employment in Calcutta, ler the province peculiarly void of sion.

Towns of Bengal.—*Calcutta*, the tion of an early generation of sh "adventurers," is situated some y miles up the Hugli mouth of Gangetic system. With its suburbs, ntains a population approaching a on. The city is emphatically mer- ile, but of late years jute and paper ufactures have been established in neighbourhood, whilst the residence ne Governor-General and the large of officials surrounding him rially adds to the population ng a part of the year. The other t cities of Bengal originated in the lman occupation, when the Deputy rnors of the Moghal became practi-

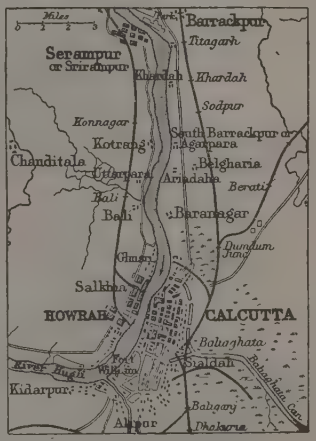


FIG. 252.—*The Site of Calcutta.*

independent chiefs. *Patna* rose on the site of the former capital of

an ancient Buddhist monarchy, and as the centre of a large and w agricultural tract it still enjoys a certain local reputation. In t resembles its compeer in eastern Bengal, *Dacca*, the centre Musalman population almost entirely recruited by conversion fro dark and semi-Brahmanised tribes of the Delta. Its repute fo weaving of fine muslins has died out, but it is a centre of coll and distribution for Calcutta and the nearer port of *Chittagong* thus just holds its own against decay. The next large town is in South Bihar, a centre of religion for the Brahmans in the presen as it was for the Buddhists in times of yore. Its population is with the improved railway communication with the trunk lines. *M dabad*, the later Musalman capital of the province, has waned to a smal centre, and its compeers, *Bhagalpur* and *Monghyr*, are practically stati *Cuttack*, capital of the Orissa division, maintains the rate of growt vailing in the rural neighbourhood, but with the completion of the trunk line of rail from the east coast is likely to take a higher comm position.

The United Provinces of Agra and Oudh include the valley of the Ganges and a small portion of the hill region of the C Belt, to the south, and of the Himalaya, on the north. The populati 48½ millions, including 800,000 under petty chiefs, is mostly settle the fertile plains, with a density of 536 per square mile in Oudh, a average of 432 for the whole province. While the physical conform and ethnographic distribution are less varied than those of Bengal, is far more diversity in the produce of the soil. Rice gives place to m in the south and centre, and to wheat in the north and west, varied pulse and cotton. Towards the east the poppy is cultivated to a siderable extent, as in Bihar, for the preparation of opium; indig reappears, and rice regains a part of its importance. The western southern tracts of the province, however, are within the zone of unc rainfall, and during the last thirty years have suffered from famine se on four occasions.

Towns of the North-West Provinces.—The number of towns is above the average of India, owing mainly to the numb petty chiefs formerly, and in later years to the assignment of estates for colonisation by private enterprise. There are no less six large cities. Three of these owe their situation to conver of access to the sacred river, Mother Ganges, where it con navigability with religious merit. *Benares* heads the list, and tains its rank as the chief religious centre of the Brahmans. *pore*, though in the midst of Hindu traditions, stands now in the of the manufacturing enterprise of upper India. The Musalman of *Allahabad* has been adopted for the *Prayag*, or Confluence, o Hindus. The town is placed at the junction of the Ganges an sacred sister, the Jamna, and in modern times has been popularis

grimage centre by the junction of the trunk railway lines from ern, eastern and western India. In the same way, *Agra*, one of the al capitals, has been saved from decay by its recent connection with estern railway system on the one hand, and that of the central tic valley on the other. A second town originating with the tem- dominion of a local Musalman chief, is *Bareli*, in the sub-Himalaya and now, like *Meerut*, both a railway and a manufacturing centre of importance, not unaided by the addition of large British military ments in the suburbs. *Mirzapur*, on the other hand, which once ed, from its position on the Ganges, a large through trade in cotton considerable local weaving industry, is decreasing in population. dh the caprice of a local chief is well shown in the establishment of *ow*, a city with, even in its decadence, over a quarter of a million itants, in supersession of its neighbour, *Faizabad*, itself an adjunct Brahmanic centre of *Ajudhia*, on the Ghogra, which does not now in 100,000 people. The industrial arts fostered by an Oriental court ourish in Lucknow, owing to the custom of the surrounding land- and, to some extent, of the British station, which, since the Mutiny, een a large one. In the north of the province, *Moradabad* and *hanpur* have developed a considerable industry in sugar.

he Panjab, in its modern extension, comprises not merely the of the Indus and its great tributaries, but a portion of the Jamna n. The new **Frontier Province** lies to the west of the Indus, and ns an area of 16,500 square miles, and a population of about llions, chiefly Musalmans, of Pathan or Afghan descent. The State shmir, too, has been confirmed in its suzerainty over the frontier inships of the Hindu Kush range and the upper Indus valley. the 20 millions directly administered by the British Govern- is increased by the population of the States under Sikh, Musalman nall Hindu chiefs to nearly 25 millions. The density of population test in the plain of the five rivers. The Himalayan valleys and the ains of the sparsely watered south-west show but a low density, and ir is thickly peopled only in the valley of that name. The remarkable e of races to which history testifies, has been to all practical purposes ted over almost the whole province by the more dominant distinc- religion. The orthodox Brahmanic creed flourishes along the and in the sub-Himalaya. In the centre of the plains the Sikh nity is pre-eminent, whilst the tendency of Islam to prevail grows r towards the west. The northern origin of the mass of the ry is apparent in their superior physique to the men of other pro- like whom they are mainly cultivators, with a special system of organisation. Towards the south-west the absence of irrigation expanse of open land covered with coarse grass have given nce to pasture and cattle-breeding; but elsewhere the autumn plies the millets and fodder for the year, whilst the spring harvest

is chiefly composed of pulse and, above all, of wheat and barley, of the frontier province is one of the principal exporters.

Towns of the Panjab and Frontier.—Setting on one sid numerous middle-class towns due to the wheat trade and to the exte of railways which has raised it to importance, the larger centres Panjab are of peculiarly modern and definite origin. *Delhi*, no stands on the ruins of ten cities, one over the other, and for miles the country tells the tale of past grandeur and decay; but the ex city, the only one associated in India with the imperial idea, ow position and fame to the Moghal dynasties. At the time of the h prosperity of that line, the city was known as the *camp* of the Em and, when he moved northwards during the hot season, three-four the population migrated with him. Delhi has now begun an indu career on European lines, which, with a large wheat and produce m and direct communication with all parts of upper India by rail, e its prosperity. *Multan* stands exactly where a city always has stood history began, near the junction of the five rivers with the Indus, edge of the desert, and touching the border land between upper Indi Sindh. *Peshawar*, at the mouth of the Khaibar Pass, has in like m been selected by uncounted generations as an outpost against inv The existing town, however, now the capital of the Frontier Provin to a great extent the creation of the great Sikh chief, Ranjit Singh under British control, contains a population nearly as much Central A as Indian in its appearance and composition. *Lahore* is still what Singh made it, the political capital of the Panjab, and it is also siderable railway centre. *Amritsar* remains the head-quarters of th religion, and is a place of industrial note, especially in textile trade situation, in the middle of a fertile plain, as well as its sacred repu probably induced the Sikh leaders, when they had established a m authority, to substitute, as their centre, a more defensible position banks of the Ravi. The modern military station of *Ambala*, ho and the fortified position of *Rawalpindi*, stand on the dry plain. Th States lie mostly in the east and centre of the province, and the Mus chief of Bhawalpur rules along the frontier between the Panjab putana and Sindh.

Sindh was placed, on its acquisition in 1844, under the Gover of Bombay, from which, however, it is separated geographically by of desert, and communication, accordingly, has to be maintained It is bordered on the west by a line of barren mountains, and on th by sand-hills and desert. The small area of arable land in the tract is the only part of the province where cultivation is dep upon the rainfall, which, though scanty, suffices for the light c millet and pulse entrusted to it. The delta receives a heavie and absorbs a considerable amount of moisture from the sea-w but the rest of the Indus valley and its neighbourhood is cult

er after the annual inundation or by means of artificial irrigation from great river. Rice and millets are the main crops, but wheat is now wn to an increasing extent on the borders of the Panjab. In this t of Sindh the climate is almost rainless. It is also the hottest and one he coldest in the country.

Towns of Sindh.—The opening of *Karachi* harbour has attracted greater part of the produce trade of north-western India with foreign ntries, the result being to raise the population more than 58 per cent. in 20 years ending with 1901. *Tatta*, the old capital of the Indus delta, fallen into decay. *Haidrabad*, at the apex, has considerable trade and l industries are active, especially since road and rail communication been extended. In upper Sindh, the old commercial capital, *Shikarpur*, ys a reputation far beyond what its size would imply, since it contains latively large population of merchants who for generations have done iness as far as the Caspian, Samarcand, and even Moscow. It is one he comparatively few instances in India of a town being established and rishing upon almost entirely commercial considerations. It stands in open plain, bordering on the desert which has to be crossed before ching the highways leading to Kabul and Herat respectively, through han territory, and thus constitutes the trade complement of Kandahar. situation of *Sakkar*, on the Indus at a point where the rocky banks uit of its being bridged, has raised the town to a new position ; its ness, both by rail and river, is considerable, and its strategic import- e in excess of its size. The population of Sindh, over 3,200,000, is rwise but thinly scattered over the rural tracts, with an average of nore than 68 to the square mile.

Bombay.—The Province of Bombay is irregular in shape and distribu- and a large number of comparatively small protected States are ered throughout British districts, especially in the north and south. ie north is the fertile low-lying tract of Gujarat, rising to the hill s of the central plateaux. Stretching eastwards from this lies the uctive Tapti valley, as far as the confines of Berar and the Central inces. The Konkan forms a long narrow strip, mostly of shallow soil, the coast, as far as the nearest approach of the Ghats to the sea, in ra. Above this lies the great tableland of the Dekkan, of which the n within this province is about 200 miles in breadth, with a soil in the lower, or depressed situations, light and shallow in the , and the greater part exposed to an unusual extent to the chance of of rain. As the rivers derive their supply entirely from the south- n air-current, the same cause which renders irrigation necessary in a ason also shortens the supply of water in the reservoirs formed at ads of the Ghat valleys to feed the channels. Hence the compara- frequent occurrence of agricultural distress. The linguistic divisions province, though strongly marked, do not coincide with the phical, except as regards Gujarat. Marathi, which prevails exclu-

sively over the Tapti valley and the Konkan, and also, of course, home, the northern Dekkan, fades imperceptibly into Kanarese toward south and south-east. The population, especially in Gujarat, is remar for its relatively high proportion of the trading element, and merc of this tract are found plying their trade all over the west and so India, and even venturing to Zanzibar, Mauritius and Madagascar mean density in which the population of 15 millions is distribut just over 201 per square mile. The people subsist on the cultivatio only of millets, rice, wheat, pulses, and other food crops, as in most I provinces, but also of cotton, of which the west coast and Tapti valley almost a monopoly for the foreign market. The commercial charac

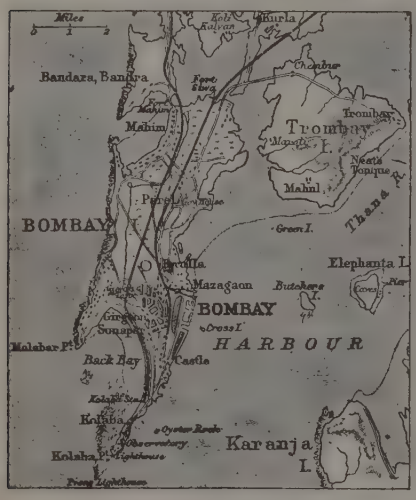


FIG. 253.—*Site of Bombay.*

the upper classes is refl in the unusually high portion of the urban lation, which reaches 2 cent., or more than d that of India as a whole

Towns of Bomba *Bombay*, the business c of the province, is enti British creation. Its a sition in the dowry of C rine of Braganza was a hardly appreciated b new owners, Pepys n in his Diary that "The E gals, it appears, have *ch* us in the island of Bomb It has a population of 77 the plague having kill scared away over 40,000 1891. Its trade goes m by the Suez Canal to West, or by Singapore to the East, with a rising share in the commer southern Arabia and east Africa. In Gujarat is the old Musalman ca *Ahmedabad*, now a military station, a railway centre and a manufact town, with much through trade in cotton and wheat. *Surat*, the trading centre of the British in India, has ceased to be a seaport, d to the silting up of the mouth of the Tapti. *Poona*, the capital o Maratha power under the Peshwa, and still the headquarters d the rainy season of the Provincial Government, retains much of its f character in the absence of modern trade-bustle and the predomina the Brahman element. *Sholapur*, on the other hand, in the north-ca the Dekkan, and *Hubli* in the south-west, have thrown themselves int stream of modern progress, and set up large cotton factories and rai

rks respectively. The same tendency is visible in several of the smaller ns, some of which are highly progressive.

Berar.—The small province of Berar lies between the Satpura and the kan, and, with the exception of a hilly tract to the south and a smaller one he north, consists of a level and very fertile plain. The inhabitants, uced by famine from nearly 3 millions to 2,754,000, are almost all ratha by race, with a sprinkling in the north of the dark hill tribes. agriculture is noteworthy, because, of all the provinces, Berar alone duces relatively more for export than for home consumption. It has a staple of cotton, and excellent oil seeds and wheat. This advantage conduced to the conversion of local markets into the resort of foreign lers, Indian and European, and thus, although the chief towns, *Ellich-* and *Amraoti*, are small, they are busy at the harvest season out of portion to their permanent population.

Central Provinces.—The irregular tract known as the Central vinces comprises, first, the nucleus of the hills and plains round Nagpur; , the Narbada valley with the broken country to the north, forming of the Central Belt of hills, and, thirdly, the plain of Chattisgarh to the anadi, with the wild forest tract separating it from Orissa on the east, the Telugu country of Madras and Haidrabad on the south. In the pur division and high up the Narbada valley, the Maratha element dominates, whilst throughout the hill tracts, and over a great part of the ern plains, the dark tribes, either in their primitive purity of race or ely mixed with settlers from the Gangetic plain, are in possession. valleys and the Chattisgarh plain are fertile. The north and west duces most wheat, millets, and pulses; the east more rice, blending ards the west with the dryer crops. The hills and forest tracts pro- e little but light crops of the smaller millets. The population of 10 ions in the area under British administration shows a density of 114 square mile, against 125 before the last famine, and the corresponding re for the 2 millions in the petty native States is only 67 against 73.

Towns of the Central Provinces.—*Nagpur*, the centre of the atha power of the Bhonslé family, has the beginnings of a con- able trade in produce and of the cotton industry. *Jabalpur*, com- ling the upper Narbada valley, and on the trunk line between the and upper India, is a local centre of the wheat trade. *Saugor*, litary station in the heart of the central hill belt adjoining the etic valley, has merely local importance. The old Musalman al, *Burhanpur*, on the Tapti, stands still, and much of its industrial commercial repute has passed to modern places. On the other *Raipur*, the chief town of the fertile Chattisgarh plain, has reaped benefit of its recent connection with the railway system joining ur with Bengal, not in permanent residents so much as in traffic in and rice, attracting a well-to-do floating population during the 1. In other parts of the province the pacification of the country ally has tended to the expansion of the native tendency to trade at

movable weekly markets supplied from the larger centres, rather th
the establishment of new towns.

Madras.—The Province of Madras comes next to the Gar
provinces in population, containing 38 millions of people, with a
density of 269 per square mile. In addition, there are States politically
nected with it, with a population of over 4 millions and the high dens
420. The distribution, however, is very uneven. The fertile strips alon
north-east and the south-west coasts differ in physical character fro
rest. The hilly country which hems in the former is of the same des
tion as that to the south-east of the adjacent Central Provinces.
Malabar coast is separated from the tableland by more rugged cou
especially where the Ghats widen out into the Nilgiri on one side
the Anamalai range on the other. The more or less flat region along
east coast is far wider, and the edge of the tableland in that directi
but faintly defined until it approaches the Nilgiri in the south.

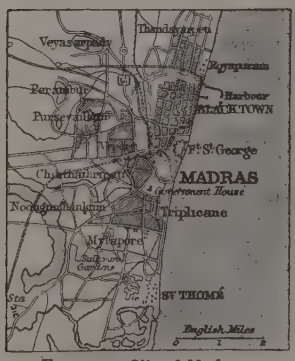


FIG. 254.—*Site of Madras.*

the physical divisions of the pro
correspond fairly closely with th
matic. First, the tract dependent
the north-east air-current, from Oris
Cape Comorin; then, the sphere o
full force of the south-west air-cu
and finally the tableland between
two, subject, like the rest of the Del
to light rain and occasional dro
The dense population along the co
supported mainly by rice, which th
failing rainfall on the west and the
irrigation works from the three
rivers on the east, render amply suffic
The former of these tracts is ric
spices, coco-nut, and, since British
pation, in coffee and tea. Millets and oil seeds, with a little cotton, ar
staple crops of the uplands. These differences, with those of language
the wide development of the caste spirit, keep the people apart t
unusual extent.

Towns of Madras.—Large towns, with the exception of the
ports, are little more than local trading centres, or, like Tanjore
former residence of a chief and his court. *Madras*, with a popul
of over half a million, is, like Calcutta and Bombay, the result
British occupation, and was, in fact, the first permanent territ
possession of the Company. It has, however, few manufactures,
owing to its open roadstead, far less trade than its fellows, and the dev
ment of the smaller ports such as Negapatam, Coconada, Calicut, Ma
lore and Tuticorin, diverts much of the exports which would other
have been obliged to seek an outlet through the capital. Madras, acc

, is relatively more of a literary and professional centre than either utta or Bombay. The same feature is to be found in *Madura* and *baconam*; *Trichinopoly* has considerable local business to keep it *Tanjore*, with about the same population as its neighbour Com- nam, is both the centre of the most densely peopled tract in hern India, along the lower Kavari, and has the tradition of a re Court, which only ceased to exist in the middle of the nineteenth ury, so that the classes attracted by its favour have not yet died *Bellary*, like Trichinopoly, is the centre of a large agricultural , though by no means to be compared with the south in fertility population. It has, however, railway communication with east west, and a large military suburb. *Calicut*, the principal port of abar, is a town of ancient fame as the capital of the Zamorin, and revived of late years its long-standing trade with the West. On east coast, *Negapatam*, has opened considerable trade with Ceylon, na, and Singapore. The same enterprise is found in the smaller s to the northwards on that coast, *Coconada* and *Masulipatam*. *m* is an important local centre, and used to have a good reputation its steel and iron, now declining, partly owing to foreign competi- partly to the want of cheap fuel for the wasteful method of smelting in tice.

Assam.—The frontier province of Assam, in its correct limitation to Brahmaputra valley and the adjacent hills and mountains, is not con- ed by its people to form part of India, and some discontent was caused 905 when it was united with parts of Bengal to form the new province of *tern Bengal and Assam*. Before this political regrouping the adminis- on of Assam, including the outlying hills and the State of Manipur, con- ed a population of over 6 millions, about half of which belonged to the hern portion. The mean density of population in the province 12 per square mile, but this is a figure of no practical value, since he Surma valley the density is 319, in the Assam valley 117, and ne hill country only 25. There are no towns of more than 14,000 bitants. *Sylhet*, the chief market of the Surma valley, reaches that ber, and *Gauhati*, a central landing-stage on the Brahmaputra, has r less. The political headquarter station is *Shillong*, high up in the ia hills. In 1897 it was almost levelled to the ground by an earth- e. About two-thirds of the crops raised consist of rice. A small area der jute and oil seeds, and in the hills small patches are cleared for e grains. The great feature in the agriculture of the province is the t development of the tea-planting industry, originally entirely con- ed by British capital under British superintendence, but now shared atives of the country. The average annual tea export of India een 1897 and 1902 exceeded 170,000,000 lbs., to which Assam is the st contributory.

Burma.—The province of Burma is still divided for administrative oses into Upper and Lower, and these titles very fairly connote the

climatic difference between the two. The further subdivision geographi suggested is that into plains and hill tracts. Lower Burma, whether *Arakan* strip, partly colonised from Bengal, the *Tenasserim* strip, bord upon Malay characteristics, or the intervening delta of *Pegu*, is emp cally a damp or rice-producing region. The riverain tracts of U Burma, on the other hand, lie high and dry, unswept by any strong vap laden winds, liable, accordingly, to drought, and producing millet, oil s cotton, and a little wheat, with rice wherever, as near hills, there is suffi moisture. The population, again, is well demarcated, not according t two great territorial divisions, but into those of the Irawadi valley, wh in the Lower or the Upper division, and the darker and uncivilised t of the hills. Throughout the rice tracts communication is difficult trade confined to local centres on rivers or creeks. The railway intersects Burma from north to south, with branches to the principal lying markets. Next to rice, of which the exports amount to no below half the estimated produce, the chief material sent abroad is timber and cutch, or catechu.

Towns of Burma.—The population of 10½ millions, scattered about 237,000 square miles, shows a very low density, and, with exception of Mandalay, the capital of the late King of Upper Bu and the comparatively new seaports, the towns are chiefly little than local markets. *Mandalay*, well situated on the Irawadi, attra most of the trade from the north and east. The great outlet, howeve the produce of the province, is *Rangoon*, in the delta, rapidly increa in population. The former local capital, grouped round a celeb Buddhist temple, has become a busy seaport, with a considerable nu of commercial establishments attracted from India and even Chin addition to the strong British element now settled there. *Maulmain* next port in importance, has about one-tenth the trade of Rang and exports chiefly timber and other forest produce. The centre o trade of the Arakan coast is at *Akyab*, but it has little beyond influence. In the north of Upper Burma the town of *Bhamô*, on Irawadi, though very small as yet, is likely to increase considerably, as the only town on the Chinese frontier, and, also, owing to its con tion with Mandalay and the rest of Burma by rail as well as steamer.

Protected States of Rajputana, &c.—States not directly adm tered by the British but remaining under their own chiefs are scattere over India. The greater number are congregated in the tract know Rajputana, with its extension to the peninsula of Kathiawar on the west to the plateau of Central India in the south-east. This vast region is parc out into States varying in area from the 37,000 square miles of Marwar t four or five miles under a petty chief on the coast or embedded among powerful neighbours in Central India. The subjects of Sindhia in Gw number two millions, of Jaipur, over 2½ millions, and several other c rule more than a million. Whilst the south and east of Rajputana are fe

west is principally desert, with from 7 to 60 people to the square mile. ntral India comprises the Malwa plateau, the Chambal valley, and the country of Rewah and Bundelkhand, all more or less favoured by nature, l far more densely peopled now than eighty years ago, when they were cockpit of Indian rivalries. Acting upon the principle of confirming possession of the actual chief at the time of the assumption of erainty, the British Government sterotyped the conditions of the first rter of the nineteenth century, so we find in power not only the ancient s of Rajputs, at *Udepur, Jodhpur, Rewah* and *Jaipur,* with their offshoots *Kathiawar,* but the Maratha military dynasties of Sindhia and Holkar, and Pindari freebooters who had carved out little States for their families hose troublous times. These tracts have been included in the general tem of Indian railways, and several of the chiefs have constructed der lines in their own territories, to the great advantage of the outlying ts of the country. Unfortunately, the eastern portion of both Rajpu- a and Central India falls within the zone of liability to famine, and hin the last half-century has been severely visited by that calamity on ee or four occasions. The rest of the country, however, where not ually in the desert, is fertile and well watered, either naturally or by lls or channels. In every State the chief's headquarters constitute the ncipal town, and in addition to *Jaipur* with 160,000 and *Gwalior* with 000 inhabitants, there are five towns of more than 50,000, each much embling the other in general features. Much of the territory of the kwar of Baroda, with a population of just under 2 millions, is scattered letached morsels in the midst of British districts and Kathiawar chief- ships. Like the rest of Gujarat, the soil is remarkably fertile, and ports the heavy density of nearly three hundred people to the square e. The central and most valuable portion of the State lies round *oda,* the capital. The city has considerable trade and a large pro- sional element. There is no other town of importance in the State.

Haidrabad.—The principal State in the Dekkan is that of Haidra- , founded by a Moghal viceroy, who asserted his independence on the ie of the empire of his sovereign. It is very compact, contains over 00 square miles, and a population of over 11 millions. As it lies rely on the Dekkan plateau, its subdivisions are mainly linguistic. -athi prevails in the north and west; Kanarese in the south-west, Telugu, to the east. All but a portion of the north and east within the famine zone. The soil is of much the same character as of the Bombay Dekkan, but improves slightly towards the north- . Recently there has been a successful attempt made to utilise large coal deposits in the eastern portion of the State, and the ly from *Singareni* is now in demand on railways for a considerable us from the mines. As in the other States, the capital town, *Haidrabad,* rbs most of the urban population of the Nizam's territory. Its situa- seems to have been selected of yore with a view to defence, before the

days of long range artillery, as it lies in a plain, watered by a small r
but with low hill forts at a short distance. The next town in size
older Musalman foundation, *Aurangabad*, with a small population,
designed for strategic purposes in the early days of Dekkan expedit

Mysore completes the list of Dekkan States. It lies, like Haidra
entirely on the tableland, bordering on the Ghats to the west, the N
on the south, and the edge of the plateau on the south-east. The
is about 28,000 square miles, and the population nearly five mil
The soil is more fertile on the whole than in the northern Dekkan, but
of the State lies under liability to drought. For fifty years, endin
1880, the State was under British rule, and the system then in force
continued after the rendition to a scion of the former reigning family
is thus a fair example of foreign initiative under Indian administra
The general agricultural character of the State has been to a small e
relieved by the opening of gold mines in the south-eastern tract.
enterprise has not proved remunerative, from a financial standpoint, e
to a few of the companies engaged, though the metal is certainly f
in fair quantities. The long period of British administration, tog
with the still longer term of Musalman usurpation which preceded it,
obviated the usual concentration of the urban population round the p
of the chief. Thus *Seringapatam*, the Musalman capital, is now a
town, the descendants of Tippoo Sultan having been deported beyond
frontier of their late father's dominion. *Bangalore*, the chief seat o
British in Mysore, is much larger. *Mysore*, the chief's capital, doub
suffers at present from the superior commercial advantages of its mo
neighbour. Both, however, are now connected with the trunk line
Madras and the northern Dekkan, a precaution taken after the great fa
of 1877. The forests of Mysore, which lie along the Ghats and round
Nilgiri are, with Burma and the Assam lower ranges, the only haunt o
wild elephant left in India. They also furnish the greater part of the sa
wood used for carving and for the sacrificial ceremonies of the Brahm
and in parts have been cleared for the growth of coffee by British plan

Travancore and Cochin.—South of Mysore, isolated amidst
mountains and lagoons of the extreme south-west of the peninsula
the two little States of Travancore and Cochin, politically conn
with the Government of Madras. Physically, these States resembl
neighbouring Malabar tract, and the people are of much the same
and habits as to industry and occupations. The barrier set by
between classes, however, is maintained inviolate, and society is altog
on a basis which, though prescribed by Brahmanic theory, the
accessible part of India has long abandoned.

Kashmir.—In Kashmir, on the other hand, a State almost eq
isolated from India by the Himalayan ranges, the masses have long
converted to Islam, under the influence of the Moghal emperor
made the valley their summer quarters. The State itself, however,

en extended far beyond the valley, and includes a portion of the Upper dus as well as the sub-Himalayan State of Jammu, from which the ief originally came. The inhabitants of the bleak plateau of Ladakh d of the gorges of Baltistan, are of the Tibetan type and language, d Buddhistic in faith. The people of the southern hills, again, differ race and language from those of the valley. The civilisation of Kashmir practically centred in *Srinagar*, the capital, and *Jammu*, where the court ends the winter. The weaving and silver-working industries still survive the capital, but the rest of the country is as purely agricultural as the ins of India. The outlying States of Hunza, Nagar and Chitral, which n the suzerainty of Kashmir, have only been brought within the sphere British-Indian influence of late years. Their country is barren, except ng the streams running through the deep valleys, which provide food the sparse population.

Baluchistan.—The territory known as Baluchistan lies altogether yond the geographical frontier of India, though included in its litical area, the whole being a Protectorate under the British Govern- nt. It is bounded on the east by Sindh and the south-western njab; on the west comes Persia; on the north, Afghanistan, whilst south touches the Indian Ocean. The coast, however, possesses harbour, though there are two fairly convenient roadsteads at adar and Sonmiani. This portion of Baluchistan boasts of the bad -eminence of being the hottest place in Asia, but its title is disputed Aden and upper Sindh. A considerable part of the country is entirely ert, and none but a comparatively small tract along the Sindh border a few valleys in the north-east is sufficiently well watered to pro- e more than a scanty crop of grain or a little fruit. The area is about 000 square miles, with a population of about 812,000. The prevailing es are the Brahui and the Baluch. The former predominate in the , the latter towards the mountains and the Panjab. They are divided eight States, one large and seven small; the former, Khalat, exercis- a sort of suzerainty over the rest. There is no town of any importance. *lat*, the largest, contains only about 15,000 inhabitants. In the north Baluchistan lies the portion ceded to the British on lease, with the tion of the valleys annexed from Afghanistan at the conclusion of the in 1880, and those to the east, through the Sulaiman range, occupied 887 and 1889. The population of this tract is about 308,000. The town is the military station of *Quetta*, with a population of about ty-four thousand, including troops. The Sindh-Pishin railway and a through the Bolan Pass connect Quetta and British Baluchistan with ndus valley.

The Andaman Islands.—The group of the Andaman Islands lies t 600 miles south of the mouth of the Hugli river, and some 160 from the coast of Burma. The main portion consists of three w islands, mountainous and thickly clad with bamboo and valuable

timber. The highest peak reaches 2,400 feet above sea level. The rai fall is heavy, as the islands lie in the direct course of the monsoon curren The inhabitants, about 1,900 in number, appear to be of Negrito or Mal descent. They are very timid of strangers, and though attempts ha been made to civilise those on the larger islands, only a few have se th down. Since 1789 the only use made of the Andamans by the Indi Government has been as a convict settlement. The present station *Port Blair*, one of the finest harbours in the East, was established 1858, and contained, in 1901, 16,000 convicts, warders, and officers. T islands constitute a Chief Commissionership under the Government India. The heavy and malarious climate in the interior of the islands h prevented European exploration, but of late the natural resources of t country immediately round the settlement have been utilised and n products introduced.

The Nikobar Islands.—This group is less than a third of the s of the Andamans, and forms a similar line stretching southward towar Sumatra, separated from the Andamans by the Ten Degree Channel 10° N. They were occupied by the British in 1869, after a formal cessi by the Dutch. The inhabitants, numbering about 6,300, are of two d tinct races, one of a Malay type, superior to the Andamanese, the othe Mongoloid, of lower civilisation, driven from the coast to the interi The coco-nut palm, which is not found wild in the Andamans, flourish and affords a plentiful supply of copra and fibre, to procure which so fifty or sixty vessels regularly visit the group. Unlike the Andamans, t Nikobar group contains no good harbour, and but a fair anchorage, *Nancowrie*. Owing to the rough sea and strong currents, there has nev apparently, been any intercourse between the two groups, an isolati which, perhaps, considering the nature of the tribes, has conduced their survival.

The Lakadiv and Maldiv.—The island group of the Lakad consists of very numerous coral atolls, about 200 miles from the co of Malabar. The Maldiv Islands form a long chain also of coral form tion, stretching to the south. *Div*, or *Dvipa*, means island in the languag derived from Sanskrit, and *Laka* probably means a hundred thousa and *Mala*, a Dravidian equivalent of one thousand. The inhabitants both are Muslim, probably of Arab origin, with a little of the fishi blood of the opposite mainland added, in the Lakadiv. They live sparse upon fish and, in the Maldiv, on the produce of their coco-nut pal which they sell in the Malabar or Ceylon markets. For administrat purposes, the Lakadiv, with a population of just over 10,000, form part the two districts under the Madras Government which lie nearest th and the Maldiv are under the colonial government of Ceylon. The tw groups speak different languages, that to the south being allied to t Singalese, that of the Lakadiv to Malayalam, an offshoot of Tamil.

STATISTICS.

Province or State.	Area in square miles.	Population. 1891.	Population. 1901.	Density per square mile.	Percentage of urban population. 1901.
Provinces—					
Madras	141,726	35,630,440	38,209,436	270	11·19
Bombay	75,918	15,959,135	15,304,677	202	20·22
Sindh	47,066	2,875,100	3,210,910	68	12·37
Bengal	151,185	71,346,961	74,744,866	494	5·18
United Provinces { *Agra*	83,198	34,253,960	34,858,705	419	12·43
United Provinces { *Oudh*	23,966	12,650,831	12,833,077	535	7·32
Punjab	97,209	19,009,343	20,330,339	209	11·44
N.W. Frontier Provinces	16,466	1,857,504	2,125,480	129	12·70
Central Provinces	86,459	10,784,294	9,876,646	114	8·31
Berar	17,710	2,897,491	2,754,016	155	15·23
Assam[1]	56,243	5,477,302	6,120,343[1]	109	2·95
Burma[1]	236,738	7,722,053	10,490,624[1]	44	9·43
Smaller Provinces (5)	53,365	775,101	1,034,388[1]	19	21·71
Total, Provinces	**1,087,249**	**221,239,515**	**231,899,507**	**213**	**9·54**
States—					
Haidrabad	82,698	11,537,040	11,141,142	135	10·11
Baroda	8,099	2,415,396	1,952,692	241	24·01
Mysore	29,444	4,943,604	5,539,399	188	13·03
Kashmir	80,900	2,543,952	2,905,578	36	5·46
Rajputana	127,541	11,990,504	9,723,301	76	14·50
Central India	78,772	10,318,812	8,628,781	109	11·37
Other Groups (7)	271,939	22,325,848	22,570,656[1]	83	9·89
Total, States	**679,393**	**66,075,156**	**62,461,549**	**92**	**11·37**
Indian Empire	**1,766,642**	**287,314,671**	**294,361,056**	**167**	**9·93**

ANNUAL TRADE.

	Mean of 1871–76.[2] Rupees.[3]	Mean of 1881–86.[3] Rupees.[3]	Mean of 1891–96.[4] Rupees.[3]
A. IMPORTS.			
Merchandise	345,791,500	535,694,700	718,369,700
Treasure	70,729,400	134,039,800	146,285,800
Total	416,520,900	669,734,500	864,655,500
B. EXPORTS.			
Merchandise	575,813,600	841,520,400	1,089,041,900
Treasure	17,027,600	12,462,000	53,663,400
Total	592,841,200	853,982,400	1,142,705,300
C. TOTAL TRADE.			
Merchandise	921,605,100	1,377,215,100	1,807,411,600
Treasure	87,757,000	146,501,800	199,949,200
Total	1,009,362,100	1,523,716,900	2,007,360,800

[1] Including areas not enumerated in 1891.
[2] Excluding tracts not enumerated at the Imperial Census.
[3] From April 1st to March 31st.
[4] The approximate mean sterling value of the rupee in the three periods respectively 22·418d., 19·303d., and 14·60d. If these equivalents were used the total trade as in India would be seriously misrepresented, and the great and steady growth of the ts and imports completely hidden, thus :—

	In pounds sterling at average exchange. 1871–76.	1881–86.	1891–96.
Imports, Total	38,907,000	53,866,000	52,600,000
Exports, Total	55,377,000	68,685,000	69,514,000

POPULATION OF CHIEF TOWNS.

	1891.	1901.		1891.	1901.
Calcutta	682,305	847,796	Jalpur	158,787	160,167
Bombay	821,764	770,000	Bangalore	180,366	159,046
Madras	452,518	509,346	Poona	161,390	153,320
Haidrabad (*Dekkan*) ..	415,039	448,466	Patna	165,192	134,785
Lucknow	273,028	264,049	Nagpur	117,014	127,734
Rangoon	180,324	234,881	Srinagar	118,960	122,618
Benares	219,467	209,331	Surat	109,229	119,306
Delhi	192,579	208,575	Karachi	105,199	116,663
Lahore	176,854	202,964	Trichinopoly	90,609	104,721
Cawnpore	188,712	197,170	Baroda	116,420	103,790
Agra	168,662	188,022	Dacca	82,321	90,542
Ahmedabad	148,412	185,889	Gwalior	104,083	89,154
Mandalay	188,815	183,816	Multan	74,562	87,394
Allahabad	175,246	172,032	Indore	82,984	86,686
Amritsar	136,766	162,429	Ajmer	68,843	73,839

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The very numerous official reports of the Indian Government and of the various provincial governments contain a vast amount of geographical information of the most authoritative kind.

II.—NON-BRITISH STATES IN INDIA

Portuguese India[1] (*Estado da India*).—The Portuguese possessio in India are under a provincial Governor-General, residing in Goa, and a divided into three districts: Goa, Damão, and Diu. **Goa** is a territory 1,400 square miles on the strip of low ground on the Malabar coast a fringed by islands. It is bounded by the river Tiracol on the north, t western Ghats on the east, and Canará on the south. It is watered many rivers navigable by small craft, and is consequently adapted f commerce and agriculture. The principal port is *Mormugão*, and t capital *Nova Goa*, or Panjim, is the seat of an old Roman Catholic Arc bishopric. The climate is dominated by the monsoons, which give a d season from October to March, and a rainy season during the greatest he between April and September. The population of Goa is almost hal million; many of the people are the descendants of the Portuguese setth of the sixteenth century. Salt making is an important industry. **Damã** or Daman, consists of a small territory between the rivers Coileque a Calem near the coast about 100 miles north of Bombay, and of two enclav in the British territory. It is irrigated by the river Damonganga wh has its outlet near *Damão*, forming its port. **Diu** is simply a fortre (*Praça de guerra*) situated on the island of the same name at the extre south of Kathiawar on the Gujarat coast. The Gogolá territory facing D and the Panikotta fort in the Simbor inlet both form part of the D

[1] By Captain Ernesto de Vasconcellos.

vernorship. In Portuguese India, inhabited by representatives of the ferent castes of the Hindu race, as well as by the descendants of the ly Portuguese colonists, rice is largely grown and is the staple native od. Salt making constitutes one of the riches of all the divisions of rtuguese India. There are plantations of coco-nut and other palm trees. e forests are valuable for their timber trees, principally teak in Nagar-ely, one of the enclaves attached to Damão.

French Possessions in India.[1]—By the Treaty of Paris in 1763 ance lost the Indian Empire which had been founded by the genius of ançois Dupleix. There only remained five factories scattered along the labar coast and the Ganges delta; these are *Mahé*, *Karikal* and the ital *Pondicherry*, all on the Malabar coast, *Yanaon* and the station of *sulipatam* at the mouth of the Godavery, and *Chandernagore* the Hugli, not far from Calcutta. The whole area amounts to 200 iare miles and the population scarcely exceeds a quarter of a million. e imports are insignificant and the exports consist mainly of oil seeds d blue cotton cloth, the weaving of which is the chief industry of ndicherry.

Himalayan States.[2]—On the northern frontier of India the wild ntry of the southern slopes of the Himalaya has enabled two small ive kingdoms, **Nipal** and **Bhutan**, to remain independent. They keep relations with Tibet and China, but, although the territories are closed treaty to Europeans, a British resident appointed by the Indian Govern-nt is maintained at each native court. This officer does not in any way erfere with the internal affairs. Nipal, the western State, is inhabited the Gurkhas, a race of Rajput origin who dominate the remnants of lier Mongolian peoples. The Gurkhas volunteer in considerable nbers for the Indian army, and under British officers they have proved e admirable soldiers, never failing in courage and cheerfulness. The ntries are very little known, their chief resources are cattle and forest-luce. The population of Nipal is estimated at from two to five ions, and that of Bhutan at about 50,000.

III.—CEYLON

By the Hon. John Ferguson, C.M.G.

Colombo.

Position and Extent.—The "pearl-drop on the brow of Ind," as on is poetically called from its outline and position, is believed by y to have been part of the Hebrew Ophir or Tarshish. It was called *obane* by the Greeks and Romans, *Serendib* by the Arab voyagers, and *a* "the resplendent" by the Hindus and eastern peoples. It lies to

[1] By M. Zimmermann. [2] By the Editor.

the south of India between 6° and 10° N., and between 79½° and 82° E., th greatest length of the island being 267 miles, and its greatest breadth 14 It is separated from India on the north-west by the Gulf of Manar, b nearly connected with it by the Manar and Rameswaram Islands and th coral reef known as Adam's Bridge. There is no channel across the re deep enough for large steamers to pass, and surveys have been made for projected railway to connect India with Ceylon, 35 miles of which woul be on the island, 22 miles on the reef, and only 1 mile across the shallo channels.

Surface.—The maritime districts form a low, level strip round th island, widening to an extensive jungle-covered plain in the north an north-east, while in the centre of the southern part one-sixth of the surfac is mountainous. The highest summit is Pedrotalagalla (8,296 feet), th next and more famous is Adam's Peak (7,353 feet). Many of the moun tains are wooded to the summi and their slopes occupied by te coffee, or cinchona plantations but there are also great expanse of *patina*, or open grass land, an the scenery throughout the moun tain region is very fine. Th longest river, the Mahavillagang ("Ganges" of Ptolemy), flows fro an elevation of 7,000 feet in th Horton Plains, for 150 miles, t the sea at Trincomali; the othe rivers are numerous but shor There are no true lakes, but larg artificial sheets of water brighte and beautify the principal towns and there are many ancient tank some of great size, a few of whic have been restored. On the flat coasts there are several backwater expanding into large lagoons at Batticalao and other places. The tides ar nearly imperceptible, but powerful ocean currents sweep along the coast

FIG. 255.—*Adam's Bridge, connecting India and Ceylon.*

Climate and Resources.—The climate is of course tropical, bu the heat is moderated by the surrounding sea, and by the fact that th island lies in the path of the two monsoons, that from the south-we prevailing from June to September and the north-east from October t January. The hottest season is during the interval between the monsoon from February to May. The highest temperature at Colombo is 95° F and the average 80°, while there is a rainfall of 88 inches, well distributed throughout the year. At the sanatorium of Newara Eliya, situated at a elevation of over 6,000 feet, the mean temperature is only 58°, and th rainfall 95 inches. The whole of the hill country has a charming climat from December to May.

With its fertile soil Ceylon is one vast garden full of fascination for botanist and naturalist. It is the home of a large variety of palms flowering trees, innumerable orchids, and other tropical plants. The a includes the elephant, bear, panther, monkeys, peacocks, parrots, and r birds of fine plumage, as well as numerous snakes.

The gems of Ceylon have long been famous, the rubies and sapphires the mines, and pearls from the fisheries in the north. The only other eral of value is plumbago (graphite), of which about 18,000 tons are ually exported.

People and History.—In B.C. 543 a prince from northern India uered Ceylon, and a succession of 160 Sinhalese rulers followed, the of whom was deposed in 1815. There are still a few hundred igines (Veddas) in the island, and there are many Tamils from ern India, who long ago conquered the north and east of Ceylon. Sinhalese continue to form 70 per cent. of the population. The uguese reached Ceylon in 1505, and occupied the maritime parts nearly a century and a half, until they were driven out by the Dutch 40, who in turn yielded to the British in 1796, hom at the request of the native population the Kandyan king was dethroned in 1815, and the d brought under one government. The island nds in magnificent ruins of the great cities and les of the ancient Sinhalese kings, the ruins g second in extent and interest only to those of ot. The beauty of the island has made it the e of many legends, the Arabs looking on it as ome of Adam and Eve after their expulsion the Garden of Eden, hence the name of Adam's and Adam's Bridge. More than half the people are Buddhists in on, and about one-fifth are Hindus. Education is spreading rapidly igst all classes of natives, who are quick to see the advantages of ing the English language and Western ways. Missionary effort has very successful amongst them.

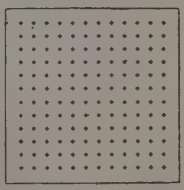

FIG. 256.—*Average population of a square mile of Ceylon.*

Industries and Trade.—Most of the inhabitants are engaged in ulture, growing rice, fruit, palms, or cultivating vegetable gardens. 1840 British capital has created a great planting industry, Ceylon the most prosperous of tropical plantation colonies. Nearly half a on Tamils, immigrants from southern India, are employed on planta- of coffee, tea, cacao, cinchona, spices and palms, and more than a on people are directly dependent on the work of these plantations. is now the chief staple, Ceylon ranking third amongst the tea- ucing countries of the world. There are 1,600 tea-plantations, cover- 25,000 acres, and yielding 130,000,000 lbs. of tea annually for export. e as much ground is under coco-nut palms, a great part of the uce of which is used as food for the people and for the distillation of

the spirit known as arrack. A certain quantity of the nuts, oil, and fib is exported, and the export of cinnamon is also characteristic. Sufficie rice is not grown for home consumption and there is a large import. Th limits of the productive capacity of the island are still far from bei reached. There is a customs tariff, which, as regards food products, "protective," generally 6½ per cent *ad valorem*, but rising to 10 per ce on rice from India.

The trade of the island is mainly with the United Kingdom and India but there is direct trade also with the continents of Europe and Australi Colombo, the chief port, is 6,500 miles from London by the Suez Cana 4,800 miles from Cape Town, 3,300 miles from Albany, Western Australi 1,600 miles from Singapore, and 1,400 from Calcutta.

Government.—Ceylon is now the first of the British Crown Colonie It is ruled by a Governor appointed by the Colonial Office in Londo advised by a Council of five leading officials, a assisted by a Legislative Council, consisting of ni official and eight unofficial nominated members. Th island is divided into nine provinces, each administere by a government agent and assistants, besides judge magistrates and police. The laws are based on th Roman-Dutch system, modified by a century of Britis legislation.

FIG. 257.—*The Colonial Badge of Ceylon.*

Railways and Towns.—There are 300 miles State railways on the 5½ feet gauge, connecting th principal towns and planting districts, and about half as much narrow gauge mountain railway. *Colombo*, the political and commercial capital i the south-west, concentrates almost the whole external trade of the islan and is the most central port of the Indian Ocean—"the Clapham Junctio of the Eastern Seas," where passengers change for India, China, an Australia. The magnificent artificial harbour is safe of approach and eas of entrance at all times. When the harbour improvements are complete it is expected that the headquarters of the East Indian squadron of th British Navy will be removed there from its present station at *Trincoma* on the north-east coast, a fine natural harbour but without trade or popu lation. *Galle*, though still a considerable town, has lost its trade since t rise of Colombo as a steamer port. The old capital of *Kandy* is a beau fully situated highland town, with the extensive and attractive botan gardens of *Peradeniya* in the neighbourhood. *Jaffna*, in the north, is purely native town inhabited by Tamils.

STATISTICS.

	1881.	1891.	1901.
Area of Ceylon in square miles ..	25,365 ..	25,365 ..	25,365
Population of Ceylon	2,763,984 ..	3,008,239 ..	3,567,990
Density of population per square mile	109 ..	119 ..	141
Population of Colombo	110,502 ..	135,000[1] ..	158,093
,, Jaffna	— ..	— ..	33,860
,, Galle	31,743 ..	33,505 ..	37,326
,, Kandy	22,026 ..	20,252[2] ..	26,522

APPROXIMATE COMPOSITION OF POPULATION.

Race.		Religion.	
Sinhalese	2,250,000	Buddhists	1,085,000
Tamil	750,000	Hindu	680,000
Moormen (Arabs, &c.)	210,000	Mohammedans	222,000
Eurasians	25,000	Christians	350,000
Europeans	5,000		
Veddas	1,300		
Others	10,000		

ANNUAL TRADE (*in Rupees*).

	1871–75.	1881–85.[3]	1891–95.
Imports	52,480,000	53,664,000	74,466,000
Exports	43,970,000	39,960,000	70,497,000

ANNUAL TRADE (*in Pounds Sterling*).

	1871–75.	1881–85.[3]	1891–95.
Imports	5,248,000	4,472,000	6,770,000
Exports	4,397,000	3,330,000	6,174,000

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1 Census gave 127,978, but known to be defective as regards floating population. An estimate in 1898 gave close on 150,000.
2 Limits of municipality altered.
3 Failure of coffee greatly affected trade.

CHAPTER XXVII.—INDO-CHINA

I.—SIAM

By H. Warington Smyth, LL.B., F.G.S.,
Late Director of the Department of Mining, Siam.

Siam, or Muang-Tai, a native kingdom between the British and Fr Asiatic dominions, may be divided into two parts, Upper and Lower.

Upper Siam constitutes the heart of the Indo-Chinese Peninsula extends north and east to the Me Kong or Cambodia river, which s 1893 has formed the boundary towards the French possessions Tongking and Annam. On the south-east it is bounded by the Fr Protectorate of Cambodia, on the north-west by the British Shan St and on the west by Burma. The largest and richest part of the cou drains into the Gulf of Siam. On the west the Me Klawng flows bri down from high jungle-covered mountain ranges, the home of the eleph the rhinoceros, and the sambur. Farther eastward the great river of S the Me Nam Chao Praya, and its branch the Tachin river, wind t tortuous courses through "attap" and mangrove swamps to salt water ; the Bang Pa Kong flows into the north-eastern corner of the gulf from south-eastern ramparts of the Korat plateau, through the gold district Kabin and Watana, and the rich rice plains of Petriu.

The Me Nam Basin.—It is to the central river and its networ creeks that Siam owes her wealth. Rising in the Lao, or Siamese S State of Nan in about 19° N. and 101° E., it is known for the first miles of its course as the Nam Nan, and flows through a comparati elevated valley, flanked and often diverted by forested ranges. Al 17° N. the river emerges from the Lao district into the great plai Siam. Three important tributaries come in from the west, and f with the main river the principal thoroughfares of the country for essentially aquatic population which clusters along their banks. T upper waters of these rivers are diversified by high forest-cove ranges which raise their massive granite shoulders or fantastic limest peaks to 6,000 or 7,000 feet above sea-level.

On these hills the teak tree (*Tectona grandis*), commercially the m important of the woods of Siam, and several varieties of *Dipterocarpus* other huge forest trees abound. The villages can generally be seen a by the bamboos, and the areca and coco-nut palms, which give th shade ; rice, tobacco and cotton are the chief crops.

The climate of the mountain valleys is practically that of the Shan Sta

rally. After the rainy season comes the cool dry north-east monsoon, the thermometer at night from 30° to 40° F., followed by the heat which lasts, with the thermometer at 90° to 105° by day, from uary to the rains. The heat of the great alluvial plain is tempered proximity to the gulf, and while the rainfall is usually not great (60 to ches), the thermometer seldom reaches 100° at the hottest season. The nt of moisture in the atmosphere, however, makes the climate of the nds peculiarly trying. The malarial fever of the plains is less acute the forest fever of the northern valleys, but cholera and dysentery are frequent.

he Me Kong Basin.—Only five streams of any importance flow from ese territory eastward to the Me Kong; the Nam Kok and Nam Ing e extreme north, the Nam Loë and Nam Mun from the Korat plateau, he Sangke or Battambong river, draining the Cambodian provinces into reat lake. Though navigable for some distance for the native dug-out e, all these rivers during the dry season are much impeded by ows, tree trunks and the like, and in the rains they are turbid torrents eat depth and swiftness. The Korat plateau lying between the great rn bend of the Me Kong on the 18th parallel, and the Dawng Phraya nd Dawng Rek ranges, which form its ramparts on the south and west, mean elevation of 600 feet above the sea. Large portions of it con- f unreclaimed swamps and salt wastes, or of open shadeless jungles nall hard-wood trees subject to inundation in the rains. The un- ility of the Me Kong for navigation, and the pestilential tracts of surrounding its other sides have effectually cut off the plateau from utside world, and excluded all incentives to trade.

ower Siam.—Lower Siam occupies part of the Malay Peninsula. south as Kra in about 10° N. the main axial range of the peninsula the frontier towards British Tenasserim. The Siamese territory a narrow strip, and the granites of the axial range have so con- and upheaved the sandstones and shales along their flanks that the ry is very rough, and, being unsuitable for cultivation, is densely ed. Outlying masses of tilted limestones are very conspicuous, l fragments of the great limestone formation which has left its traces Perak to Tongking, in the Mergui archipelago, and on the upper ng. From the Pakchan estuary southward Siam rules from coast to till the British Malay territories of Province Wellesley and Pahang ached in about 5° N.

ople and Government.—The influence exercised over the States ah, Kelantan, and Tring Kanu in the south, is rather of the nature of ectorate. In race, speech, flora and fauna they are essentially But north of the old State of Patani, from Singora in 7° N., the e are the most numerous, and their language is used by the Malay as by the Chinese settlers.

Upper Siam, besides the Siamese proper, the plain-dwellers include

the Mons (remains of the Peguan or Talaing invasions of the eighte century), Chinese, who largely intermarry with the Siamese, and sm numbers of Annamites, Cambodians and Laos or Siamese Shans, r sentatives of the old Tai race from which the Siamese are descended whose language they speak. These races (except the Chinese) for the part profess Buddhism, but generally with cons able admixture of the old Indo-Chinese na worship, and many traces of Brahmanism.

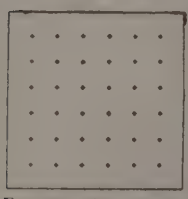

FIG. 258.—*Average population of a square mile of Siam.*

The races inhabiting the hills, whither they been thrust by the incursion of the Shans, inc some very primitive and interesting types; not the Sakai and Samang, the aboriginal people of Malay Peninsula, the Karens inhabiting the Bu frontier range north of lat. 13°, the Kas of the nort highlands and the Chongs of the Krat hills on south-east. Tribes of semi-Chinese mountaineers occupy the Me K region, all hardy nomads living in small communities and possessed o of no small taste in dress. All these races show that gentlenes disposition, and the childish simplicity and cheeriness which are the c characteristics of the unspoiled Indo-Chinese. The population of S which is distributed mainly along the canal and river banks, may roughly estimated at 9,020,020, of whom one-third are of Chinese ori

Towns and Trade.—*Bangkok*, the capital, on the muddy Nam, contains a population which has been estimated variously fro quarter to half a million. Many of the people live on the water in floa dwellings, and on shore in narrow and ill-kept streets, but Europ influence begins to be apparent in both streets and buildings. The is accessible to vessels of 12 feet draft. Of the other towns of S perhaps fifteen attain, with their suburbs and neighbouring villag population of 10,000. Most of the other *Muangs* in the country short of 5,000 inhabitants.

The Government is carried on by the King, advised by a Counci twelve Ministers and heads of the various government departments, and assisted by a Legislative Council composed of the chief nobles. The principal Lao and Malay States are still ruled by their hereditary chiefs appointed or confirmed from Bangkok, under the supervision of Royal Commissioners appointed from the capital. Many of the public departments are under the charge of European officials; but Siam is independent of European political cont

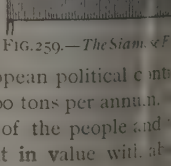

FIG. 259.—*The Siamese F*

The chief export is rice, amounting to over 450,000 tons per annum. the quality of the rice-crops depends the prosperity of the people and whole import trade of the year. Teak comes next in value with ab 50,000 tons annually. Tin mined by Chinese labour from the gran

e Malay Peninsula is next in importance, and its export exceeds tons annually. Salt and dried fish, bullocks, hides and horns, pepper, eed, cardamoms, edible birds' nests, sapan, rosewood and ironwood, and gum benjamin are the other principal exports. The chief trade e country is done between Bangkok and Singapore or Hongkong, ce indirectly with Europe and China.

STATISTICS.

(*Estimates.*)

Area of Siam (square miles)	200,000
Population of Siam	9,000,000
Density of population per square mile	45
Population of Bangkok	300,000

ANNUAL TRADE OF SIAM (*in dollars*).

	1896.
Imports	10,500,000
Exports	15,100,000

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STRAITS SETTLEMENTS AND THE PROTECTED MALAY STATES

By the Editor.[1]

he End of the Malay Peninsula.—The Straits Settlements he Protected Native States mainly occupy the portion of the Malay sula south of Siam, between 1° and 6° N. This part of the sula is separated from Sumatra by the Strait of Malacca. In the ne south, Singapore Strait separates it from the smaller Dutch s belonging to Sumatra, and serves as the channel of communi- with the China Sea. The peninsula is mountainous, the main rising 8,000 feet or more, but decreasing southward, trends on the from north-west to south-east, and a second series of ranges, more west, follows a direction generally parallel to it. From the central hed rivers, which are necessarily short, flow to the coasts, east, and west. Much of the surface is undulating and covered lense forests, varied with open grassy plains, and, in the lower swamps and marshes. The geological structure is still very imper- known, but in the central chain the older formations associated lutonic rocks appear to predominate. Tin is by far the most im- mineral; rich deposits occur in various parts of the main range s vicinity, constituting the richest and most extensive tin-field and yielding about one-half of the world's supply of this metal.

[1] Assisted by E. J. Hastings.

Iron is widely distributed, and there is some gold. The forests jungles yield valuable timber, guttapercha, gums, bamboos and rat the coco-nut, areca and other palms flourish ; rice is extensively culti in the swamps ; gambier, pepper and tapioca are important plant products ; spices of various kinds grow freely ; and coffee has been suc fully introduced. The large wild animals include the elephant, rhinoc tiger, leopard, tapir, bison, several kinds of deer, and monkeys. cobra, hamadryad, python, and other venomous snakes occur, crocodiles haunt the rivers. Peacocks, birds of paradise, parrots, pheasants are characteristic of the avifauna, and the edible birds' n collected in the cliffs and islands.

The climate is hot and humid, but owing to the free exposure o country to the sea-breezes, the heat is less intense than in other countri near the equator. The temperature varies little throughout the year. rainfall is abundant, but there are no marked wet and dry seasons, the north-east and the south-west monsoons bringing rain. The cli is, in general, not particularly unhealthy, though in some of the low malaria prevails.

People and History.—The inhabitants comprise Malays, Chi natives of India, here known as Klings ; Sakeis Samangs, remnants of the aboriginal inhabitants i interior ; Eurasians and Europeans. The Malay mainly engaged in agriculture and fishing, while Chinese, who now probably outnumber them, s almost all the mining labour. Europeans (c British) form a small minority of the population are generally engaged in the Government se or in mercantile concerns. The history of Euro influence in the Malay Peninsula dates from the capture of Malacca in by Albuquerque, who made it the centre of Portuguese dominion i peninsula. Towards the end of that century the Dutch arrived and, a long contest, culminating in the capture of Malacca in 1642, acquire supremacy. It was not till near the close of the eighteenth ce that a British settlement was effected. The East India Com occupied Penang in 1786 and Province Wellesley in 1800. In 1825, the final loss of Malacca, the Dutch withdrew from the peninsul 1819 Sir Stamford Raffles, with wise foresight, founded Singapo land granted by the Sultan of Johor, and five years later possessio obtained of the whole island. In 1826, Singapore, Malacca, and P were constituted the Straits Settlements, and in 1867 the adminis was transferred from the East India Company to the Home Gover and the Straits Settlements became a Crown Colony. The Di were annexed in 1874 ; and as remote dependencies the Co Keeling Islands were added in 1886, and Christmas Island in In 1887 the Sultan of Johor agreed to place his foreign relation

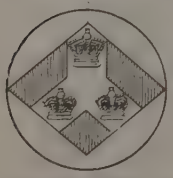

FIG. 260.—*Badge of Straits Settlements.*

lands of the British and to receive a Resident Agent, and in 1896 ative States of Perak, Selangor, Sungei Ujong, Pahang, and Negri ilan, which had previously been under British control, were united Federation under the administration of a British Resident-General.

esources.—Agriculture and mining are the chief industries. Tin is rincipal export (forming more than one-sixth of the total), next in rtance are spices, gambier, and gum. Rice is the chief import; s are cotton goods, opium, fish and coal. The bulk of the import goes to the United Kingdom, India, Hongkong, and the Dutch East s, while the United Kingdom and Dutch East Indies take the first for exports. Means of communication are still deficient, but several ays have been constructed in the native States, others are in pro- and good roads have replaced many of the old bridle paths.

he British Settlements.—Singapore Island lies south of the sula, separated from it only by the Old Strait, a narrow channel in parts han a mile wide. The surface is undulating, and the scenery very resque; dense, and almost impenetrable, jungles cover a large area, n the clearings, pineapples, gambier, pepper are cultivated. *Singapore*, the l, has advanced by rapid strides to a nercial port of the first rank. Singa- Roads afford good anchorage and r for vessels, and New Harbour, fur- west, has excellent wharfage. The is protected by batteries and sub e mines. Singapore, like Hongkong, absolutely free harbour, without a n House, and carries on an enormous trade as the meeting-place ut fifty regular steamer lines from west, east and south.

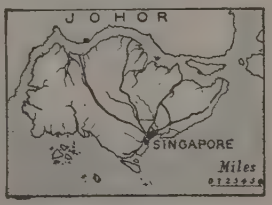

FIG. 261.—*Singapore Island.*

alacca, at the time of the Portuguese conquest, was a large and ant town, and a great centre of trade. Under the monopolising of the Portuguese and their successors, the Dutch, its prosperity sed, and still more after the establishment of Penang. The opening he district has, however, given a fresh impetus to its growth. The of Malacca is the largest of the settlements.

nang (*i.e.*, "betel-nut"), formerly called Prince of Wales' Island, ut 360 miles north-west of Singapore, and with Province Wellesley adjacent mainland is the most northerly of the Straits Settlements. annel separating the island from the mainland is about two miles id forms a very good harbour. *Penang*, which succeeded Malacca chief centre of trade in the Straits, declined with the growth of ore. Its local trade is, however, large and increasing. Province ey consists chiefly of an alluvial plain with wooded hills in the Besides the betel-nut, spices of various kinds and rice are ed.

The Dindings, about 70 miles south of Penang, comprise Pangkar or Dinding Islands, and a part of mainland opposite, lying n and south of the Dinding river.

The Keeling or Cocos Islands, a group of about twenty s forest-clothed coral islands, discovered in 1609 by Captain Keelin about 500 miles south-south-west of Java. Coco-nut palms abound yield the principal export.

Christmas Island, 200 miles south of Java, is an upraised coral the coast of which is formed by the hard rocks on which the coral while they were beneath the surface of the water. A valuable produ the phosphate of lime of which a considerable part of the rocks is posed. The island is covered with exceedingly dense forest and u growth. Large tree-climbing land crabs and great red-brown rat characteristic elements in the restricted fauna.

The Protected Native States.—These are all small States u native rulers who are advised or controlled by British Residents.

Perak, the most northerly, is about one-fourth larger than Wales. coasts are low and bordered with mangroves. In the interior are m tain ranges and isolated groups rising in the main range on the ea border to 6,000 and 8,000 feet. The principal river is the Perak, which its tributaries drains the greater part of the country, and is navigabl boats for 165 miles. Tin is the most important mineral and the source of wealth ; gold, galena, and iron also occur, besides exce china clay. Tea cultivation has been experimentally introduced. *K Kangsa*, on the Perak, is the capital and seat of the British Resident. connected by road with *Port Weld*, whence a short railway runs inla the mining centres of the rich Larut tin-fields *viâ* Taiping, and a br joins it to the Selangor lines. The Southern port of *Teluk Anson* o Perak is connected with *Ipoh* in Kinta, also a rich tin district.

Selangor, south of Perak, has inland stretches of undulating and fertile country traversed by rivers, navigable to a greater or less dist the most important being the Bernam on the Perak frontier. Tin-m is the principal industry, but agriculture is advancing. *Kwala Lampu* large and flourishing capital and residence of the British Agent, is sit on the Klang, twenty-seven miles from its mouth, at the point of converg of several roads leading from the tin-fields. A railway connects it wit river port of *Klang*, and still lower with the seaport of *Kwala K* and other lines are being extended north and south from the capi

Sungei Ujong (with which is included Jelebu) and **Negri Semb** (*i.e.*, the Nine States), lie south-east of Selangor and north of Malacca. east is mountainous, traversed by the terminal section of the main r and the west, hilly in parts. Tin-mining is the principal industry, but culture, for which the country seems well adapted, is advancing. C are reared in the west. *Seremban*, on the Linggi, has the British Resid for Sungei Ujong ; it is connected by railway with the sheltered harbo

Dickson. *Kwala Pilah* is the capital of Negri Sembilan, and residence
e British Agent.

ahang, on the eastern side of the peninsula, is about the same size
erak; the low and swampy coasts are succeeded inland in the central
by more elevated land, with numerous conical hills. The main range
ne western border is believed to contain in Gunong Tahan (probably
10,000 feet), the highest summit in the peninsula. The Pahang river,
h, with its tributaries, drains the whole central region, has a length of
niles, but is shallow, and in its lower course spreads out into lake-like
nsions. Tin, gold and galena are the chief minerals. *Pekan*, at the
h of the Pahang, is the capital.

ohor occupies the southern portion of the peninsula. A great part of
nterior is covered with dense forest and uninhabited. Iron is widely
ibuted, but not worked, and some tin is found. Gambier, sago and
er are the principal cultivated exports, besides timber and other
t products. *Johor Bharu* (*New Johor*), in the south, opposite Singa-
Island, is the capital. There is daily communication by steam ferry
coach with Singapore. *Bandar Maharani*, a small town at the mouth
e Muar, is connected by a short railway with *Parit Jawa* to the south-

STATISTICS.

	1881.	1891.	1901.
a of Straits Settlements (Colony), square miles	1,472	1,472	1,472
ulation of Straits Settlements (Colony)	423,384	512,342	572,249
nsity of population per square mile	287	348	392
a of Federated Native States	—	26,500	26,500
ulation of Federated States	—	418,527	676,138
a of Johor	—	9,000[1]	9,000[1]
ulation of Johor	—	200,000[1]	200,000[1]
nber of Asiatics in Straits Settlement (including Chinese, 227,889; Malays, 213,073; natives of India, 53,927 in 1891)		498,696	554,141
ulation of Singapore (town)		186,300	228,555

ANNUAL TRADE OF STRAITS SETTLEMENTS THROUGH SINGAPORE
(*in pounds sterling*).

	1871–75.	1881–85.	1891–95.
Imports	11,493,000	17,443,000	20,960,000
Exports	10,890,000	15,690,000	18,782,000

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III.—FRENCH INDO-CHINA

By M. Zimmermann,[2]

Of the "Annales de Géographie," Paris.

story and Exploration.—France obtained a footing in Indo-
in the year 1862, when a part of Cochin-China with Saigon and the
Condor Islands were acquired from the Emperor of Annam, a vassal

[1] Estimates.

[2] Translated from the French by the Editor.

of the Emperor of China. The colony of French Cochin-China, to wh the Protectorate of Cambodia had been added in 1863, was constitute 1870. After a war from 1883 to 1885, the French protectorate over Tongk and Annam was recognised by China. Towards Siam, France obtained 1893 the left bank of the Me Kong (the Lao country) together with rig over a zone 15 miles wide on the right bank. By a treaty in 1902 Fra gave up the right bank rights in return for territory west of the Me K and south of Pnom Dong Rek. The far eastern possessions as a wh have been known since 1888 as the General Government of French In China (*Gouvernement Général de l'Indo-Chine Française*).

The era of scientific geography in French Indo-China opened in 1 by the fine explorations of Doudart de Lagrée and François Garnier on Me Kong. The necessity of entering into direct relations with China a the States of the upper Me Kong, which were reported to be very rich, v the motive of the labours of Garnier and of Jean Dupuis for Tongking Dr. Harmand, Néis, and particularly the Pavie expedition (1887-91) throu the Lao country and the north of Indo-China. The Me Kong has been special object of energetic exploration on account of the great importa of the question of its navigability. Since 1888 the hydrographic survey the great river has been carried out with precision by a succession of na officers, and its volume and the fluctuations of its level have been studi Small gun-boats have been able to pass all the rapids with the exceptio those of Khone immediately above Luang Prabang.

Extent, Configuration and Climate.—French Indo-China exte for 14° along the left bank of the Me Kong (9° to 23° N.), and its total a is half as large again as that of France, so that its different parts pres many varieties in every respect.

The interior of **Tongking** (French, *Tonkin*) is a highland region va ing in elevation from 2,000 to 4,000 feet; the surface modelled in ge curves where the Devonian schists prevail, but often presenting a wild a broken appearance where the hard Palæozoic sandstones, beneath wh lie deposits of coal, form the surface. The deep bays and gorges of limestone region are now, as they have always been, haunts of pira These ancient rocks, forming a continuation of Yunnan, encircle the hu delta of the Red River and the Thai Binh, which has an area of 5,8 square miles. It contains almost the whole population of the countr and its uniform clayey surface, hardly broken by a few limestone crags covered with crops mainly of rice. The climate is tropical, deluges of r falling after the month of May, flooding the Red River and raising its le 20 feet; but with a clearly marked winter, when temperatures from 43° 45° F. occur at Hanoi, and frost is known in the higher land.

The skeleton of **Annam** consists of a granitic mountain-chain in t form of an arc stretching from Tongking to Cochin-China and running cl to the coast of the China Sea. This barrier cuts off the interior from acc to the coast; it rises to heights of from 4,000 to 9,000 feet and is notc

w passes, the most important being that of Ailao between Kwang-tri
he Sebang-hien, 1,000 feet above the sea. The range is covered
forest and occasional marshes, which make it still more difficult to
nunicate from the coast with the Me Kong, the interior plateau of the
country, and the stretches of denuded sandstones and open forests of
lateau of Boloven and Attopeu. The seaward slope of the chain is
hed by short coast rivers forming small valleys in which most of the
lation is concentrated. The coast, bordered by dunes and lagoons,
s scarcely any anchorage unless it be in the Bay of Turan. The
te is intermediate between that of Tongking and of Cochin-China;
ainy season corresponds to the north-east monsoon occurring not in
ner but from September to December.

ochin-China and **Cambodia** consist mainly of low alluvial land
ed by the floods of the Me Kong and
Donnai, above which only a few masses
anite project. The climate is quite tropi-
vith a uniform high temperature and a
season in summer. The ancient centre
e Cambodian kingdom was the great
Tonlé Sap, a sort of natural regulator
e summer floods of the Me Kong. At a
remote period human settlements had
formed in the marshy ground subject
riodical floods around this lake. The
very of prehistoric remains of a re-
able character in the same region
s that it was also the seat of the early
er civilisation. In the same way as
t is a gift from the Nile the whole of
r Cochin-China is a present from the
nous Me Kong, which flows down
d with the silt that has been worn
the mountains of Tibet. In its upper
e it struggles through the fissured limestones of southern China,
ds out on the sandstone plateau of the Lao country, and at the end
course of nearly 2,500 miles it forms one of the largest deltas of Asia.
transition between each of the great geological divisions which it
rs is marked by the formation of rapids or waterfalls, and thus it
ens that the Me Kong does not play the important part as a channel of
nunication which its great length and vast volume seem to mark out

FIG 262.—*The Divisions of French Indo-China.*

eople.—The principal ethnic group in French Indo-China, both from
olitical and social point of view and from its number, is that of the
mites. They principally occupy the low lands of the east of the penin-
including the deltas of Tongking and Cochin-China and the coast

plain of Annam. They are a race of tillers of the soil, of small stature feeble appearance, but are hard-working and peaceable. From the ear centuries of our era they have been under the influence of the Chin whom they resemble in their religious beliefs (ancestor-wors Confucianism and a modified Buddhism), and in their written lang The spoken language, on the contrary, is entirely different, although a Chinese, the musical value of the tones is of great importance. Anna society is characterised by absolute equality; the family is stro organised and paternal authority has preserved all its strength. *Cambodians* or *Khmers* were a powerful nation in the eighth cent their ancient greatness is attested by many magnificent ruins, inclu in particular those of Angkor-wat, situated not far from the great Tonlé Sap. Much taller and stronger than the people of Annam, Khmers are yet an apathetic people, and were probably destined be the French occupation to be subject to the yoke of their more energ neighbours the Annamites or the Siamese. The influence of I appears very clearly in their social organisation, which is based on system of caste; in their religion, a mixture Brahmanism, Buddhism and old animistic beli and in their ancient monuments. Finally the people and the inhabitants of the *Shan* States f a branch of the Thais, the same race as the Sia and the Burmese. A puzzling group of this r taller and less yellow than the Annamites and much less marked Mongolian character, also habits the high valleys of Tongking under the na of *Thos*. They are a gentle and an idle people, appear to be of very mixed descent. Besides three great groups, some very primitive tri who seem to be descended from the ancient inhabitants of In China driven out by conquering races, are found scattered through forests and on the barren mountains. These tribes are called *Peun* amongst the Cambodians, *Moi* by the Annamites, and *Khas* by the L each of these names meaning simply savages. Some of them resemble Indonesians of the Sunda Islands, and especially the Dyaks of Born There is also a Malay tribe known as the *Tsiam* and the *Meos* in the h regions of the north, who seem to have come recently from southern Ch where they were known as *Man*. The remnants of ancient peoples have been driven to take refuge in the wooded and unhealthy mounta have best preserved their original character, those living in the m open ground have been absorbed by Chinese civilisation. The Chin dominate the native trade of the whole of French Indo-China.

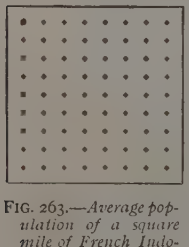

FIG. 263.—*Average population of a square mile of French Indo-China.*

Productions.—**Cochin-China** is at present the most prosperous p of the French Asiatic possessions, as it has been colonised for the lon time. It produces scarcely anything but *rice*, more than three-quarter

eared land being devoted to that crop, which is favoured by the lical inundation of the country and the remarkable uniformity of the ns. During the twenty years preceding 1895 the production has sed six-fold, and since 1899 the annual export has exceeded 600,000 forming 90 per cent. in value of the total exports of the country. It t mainly to Hongkong, Singapore and to France. The other parts of h Indo-China are still only to be viewed as lands of promise. In **am** there are untouched forests of teak, ironwood and lacquer trees, ing the great mountain range and the plateaux; the valleys on the only produce a little rice on account of the want of suitable low d, but they already yield a certain amount of cinnamon, pepper, n (at Than Hoa), sugar-cane, coffee in the plantations near Turan, ea; the last two products appear to have some future before them. **gking** produces rice principally, but on account of the density of ation, notwithstanding a very large production, the quantity available xport is much less than from Cochin-China. Silk, cotton, oils and er are also produced, and much is hoped from the cultivation of , tobacco and jute. The elevated northern districts of Luang Pra- Tranh-Ninh and Sib-Song-Panna are on the border of the tropical temperate regions, and produce some of the products of each. promise ultimately good returns from the forests of teak and valuable woods, from gum-benjamin, cardamoms, cinnamon and plantations; while there are great undeveloped mineral deposits ding gold, iron, antimony, copper and lead.

he thinly peopled **Lao** country, poorly provided with means of munication, without any great demand for trade on the part of its itants, and still tributary to Siam commercially, is in the very cy of colonial enterprise. It is known, however, that cotton grows without being cultivated.

l along the coast of the China Sea the fisheries are actively pro- d, whole fleets of junks, usually manned by Chinamen, carrying e trade. Coal mining has already made some progress in Tongking, oal of Hongay being exported to the extent of 276,000 tons in and going to Hongkong, Canton, Singapore, and even San Fran- The Coal Measures of the Bay of Along appear again on the Red at Lao Kay, near the frontier.

rade and Towns.—As in many of the French Colonies, the trade lo-China is mainly carried on with foreign countries. The imports ton yarn, textiles, manufactured articles, machinery and petroleum Australian, British, American and even Japanese origin. Energetic have recently been made to open up internal trade in two directions. new transverse routes are being opened across Annam in order ch the Lao country and the Shan States (Luang Prabang), starting Vinh, Turan and Saigon. A railway between Saigon and Mytho ng extended to Tantinh. Navigation on the Me Kong has been

facilitated by works in the Island of Khone and by laying down buoys. second object is to develop trade between Tongking and Yunnan by the River, and so stimulate commerce with southern China. For this pur a steamer service has been established on the Red River, various tre have been made with China, French consulates established at Mong and Long-cheou and a port has been acquired in the peninsula of Lei opposite Hainan. A railway runs from Haiphong to Hanoi and by Phul thuong and Lang Son, to the frontier of the Chinese province of Kwar Another line joins Hanoi to Ninbinh, and will be prolonged to Vinh.

In Tongking the life of the country is mainly concentrated in capital *Hanoi*, and in *Haiphong*, the port which monopolises the w external trade in spite of its natural disadvantages. In Annam the of *Turan* (Tourane) is one of the few really good harbours on the c and is near coal-fields which assure its future. *Saigon* in Cochin-Ch where there is a French population of 2,000, not only concent the trade of Cambodia and southern Indo-China, but is one of smartest and most attractive towns in the Far East.

STATISTICS

(*Estimates about* 1900.)

	Area, sq. miles.	Population.	Density of Popu per sq. m
Tongking	46,400	7,500,000	162
Cochin-China	22,000	2,300,000	145
Cambodia	37,400	1,500,000	40
Annam	52,100	6,400,000	121
Laos Country	98,000	500,000	5
Total of French Indo-China ..	255,900	18,200,000	71

ANNUAL TRADE OF FRENCH INDO-CHINA (*in pounds sterling*).

	1893.	1900.
Imports	3,060,000 ..	7,440,000
Exports	4,124,000 ..	6,240,000

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HAPTER XXVIII.—THE CHINESE EMPIRE

By George G. Chisholm, M.A., B.Sc.

I.—CHINA PROPER

sition and Extent.—The Chinese Empire is made up of China r and the bordering provinces of Manchuria, Mongolia, Eastern stan, and Tibet. The total area is above 4,000,000 square miles, and npire occupies the greater part of central and eastern Asia ; but the tance of China Proper much exceeds that of the vast thinly-peopled ces which lie to the west and north.

ina Proper is a country which, in spite of its vast extent (above)00 square miles) and great diversity of physical features, is on the well marked off by natural boundaries (bounding tracts, however, than boundary lines) from surrounding countries. And although ing foreign ethnical elements in considerable numbers, it is yet ted by a people remarkably homogeneous in race, language, customs eas. On the north, the boundary runs along mountains or through ly peopled steppes, separating it from Mongolia and Manchuria. are extensive remains of a great wall built about 212 B.C., which formed the frontier on the north, and still does so exactly or ximately in the west, though now China Proper extends far beyond of the middle portion of the Hwang-ho. On the west, China is red by the lofty tableland of Tibet. On the south-west it is divided he Indian peninsula and Burma by a succession of lofty mountain and profound valleys. On the south, the boundary runs in part across these mountains and valleys, and partly along the water- between the basins of the Si-kiang (West River) and the Song-koi River).

neral Configuration.—Broadly speaking China is composed of tensive low plains in the north-east, and of mountainous and hilly y in the west and south, together with an isolated mountainous ula between the Gulf of Pechili and the Yellow Sea. The two differ very greatly in extent. The larger extends from the Gulf of hou to the mountains north of Peking, a total length of about 700 the greatest width, near the parallel of 32° N., being about 400 A large part of this plain is so low and level as to be very liable to tion, the rivers being only with difficulty restrained within their The most destructive of such inundations have been caused by the

changes in the bed of the Hwang-ho, "China's sorrow," which has alt its course, or had its course altered, at least eleven times within the twenty-five centuries, flowing now north, now south of the mountai peninsula of Shantung. The minor plain is that of the middle Yang-se the lower Han, comprising all lake district of the region of great zigzag of the Yangtse tween Ichang and Kiukiang. cut off from the larger plain the comparatively low hills taining the water-parting betw the Yangtse and the Hwa Both in length and breadth measures about 140 miles.

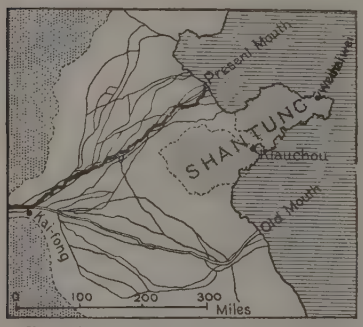

FIG. 264.—*The changes of the Hwang-ho*

The mountainous country the west and south is partly c posed of an intricate system mountain chains and spurs, narrow intervening valleys, partly of more undulating country with broader valleys, the latter predominating in the south-east. The highland regions of the north south present another contrast. The valleys of northern China are a a large extent filled with loess. This is an earthy deposit generally yellow colour, differing from clay in being highly calcareous and f marl in being remarkably porous, and that in a peculiar manner. pores are vertical, and are believed to be due to the former presenc the stems of plants rich in lime. This characteristic brings abou tendency to weather into vertical precipices. Equally characteristi the loess are horizontal terraces, a structure not so easy to explain. loess of China is believed to be due to the gradual accumulation of blown from the interior tablelands of Asia. In some places this fe soil is cultivated even at the height of 8,000 feet. In southern, o least south-eastern China, on the other hand, the higher slopes generally too steep for cultivation, and, notwithstanding the war climate, cultivation is in most parts confined to the zone below 2 feet; but in the upper part of the basin of the Yangtse-kiang, the region where numerous tributaries converge from north and so before the great bow-like bend to the north, the presence o rich red soil, filling what is hence known as the Red Basin, has cau most of the hill and mountain sides to be terraced for cultivation their tops.

From an orographical point of view a marked dividing line betw the mountains of northern and southern China is formed by the east continuation of the Kwen-lun range. In China Proper this runs for most part nearly due east and west, but finally turns round to the south-e

he west these mountains are known as the Tsinling-shan, and in the as the Funiu-shan. Their importance arises chiefly from the fact that form a serious barrier to communication between north and south, cially in their middle portion, where they cut off a fertile populous , the valley of the Wei, on the north, from the whole of southern a. In this section there are only two frequented passes separated by nterval of about two hundred miles, and crossed merely by difficult e paths. The eastern pass, whose summit is upwards of 4,000 feet e sea-level, is reached by a route running south-east from Singan, the town in the valley of the Wei, which is thus brought into connection the plain of the middle Yangtse by way of the valley of its chief ern tributary, the Han. It forms the division between the Tsinling- and the Funiu-shan. The western pass connects the valley of the with the Red Basin, but the road across it, after descending into a lel valley (the upper part of the Han), has to cross another difficult e path before that basin is reached. The passes further west, also ed by mere bridle paths, are less important, as they connect less lous regions.

onfiguration of Northern China.—North of the line of ation formed by the series of ranges, the mountainous areas of China aturally divided into two great sections, respectively west and east e deep and narrow gorge in which the middle Hwang-ho plunges and s from north to south till it turns sharply eastwards on receiving the The western section is a much diversified loess-covered region, gh which there runs only one important highway leading north-west- s from the Wei valley, and finally running along the northern or north- rn base of the Nanshan range to Mongolia and Eastern Turkestan. ast portion of this route is through a narrow neck, where the lofty just mentioned, rising to about 20,000 feet in height, forms the dary between China Proper and Tibet and the Great Wall forms between China and Mongolia. This neck, at all times the great ne from central and western Asia to the north-west of China, is n to the Chinese as the Yu-men or Jade Gate, from the fact that by this route that much prized mineral has been introduced he country for ages.

ne eastern section of the northern highlands of China is as sified as the western. It is composed, first, of a tract between orge of the Hwang-ho and the great plain, in which the moun- have a more or less southerly trend, and are divided into two sections by the important valley of the Fen-ho, the mouth of communicates with that of the Wei, and, second, of a more erly tract in which the ranges have a north-easterly trend ally becoming more easterly towards the east, where they form a of terraces, shutting off Mongolia on the north from the great on the south.

Configuration of Southern China.—The mountainous part China south of the Tsinling-shan and Funiu-shan may be convenien divided first into two regions, respectively north and south of t Yangtse. The portion on the west adjoining Tibet and extending far east as the bridle path leading into the Red Basin, is a wild a intricate region with a scanty population. East of this bridle path th is first a range called the Tapa-shan running eastwards and sendi off numerous spurs northwards to meet those running south from t parallel range of the Tsinling-shan, so that the intervening valley of t upper Han is in most parts extremely narrow, and the course of the ri itself is interrupted by a continuous series of rapids. Southwards fr this a series of m or less parallel rang runs to the Yang partly through a partly to the e of the Red Bas forming a great hi rance to communi tion between th rich region and t eastern plains.

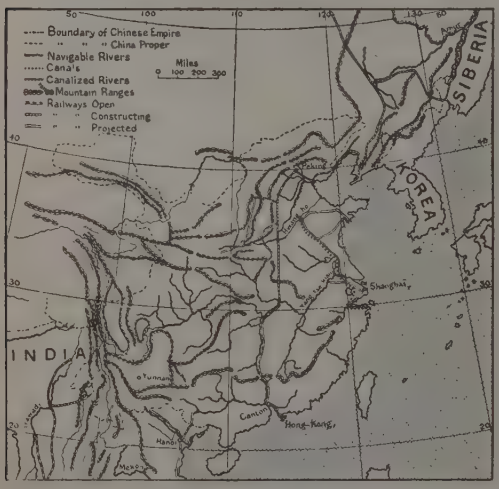

FIG 265.—*China, showing the Chief Routes and Mountains.*

South of t Yangtse there is the west an elevat region with an e tremely diversifi surface, which m be called the plate of Yunnan. Almo everywhere even t valley bottoms, all small extent, are above 5,000, some even above 7,000 feet in elevatio and on all sides there is a sharp descent to the surrounding regio To the east the mountains are so arranged as to form fairly w marked isolated river basins belonging in the north, mostly to t great basin of the Yangtse (they include the Kwei, the Tungting la and the Poyang lake), in the south to that of the Si-kiang, and in t south-east to minor independent streams. In the south-east the m important independent basin is that of the Min. The general na of Nan-shan ("Southern Mountains") is given to the highlands separati the northern from the southern and south-eastern basins. Just east of t Red Basin the spurs of these mountains advance in many places close t to the banks of the Yangtse, thus impeding communication eastwards this side also, while a further hindrance is presented by the series of gorg

ructed by more or less difficult rapids through which the river flows
veen Chungking and Ichang.

Geology and Minerals.—The geology of China is, as a rule, very
erfectly known, especially in the south. The Tsinling-shan and Funiu-
systems are nearly as marked a dividing line from the geological as
the orographical point of view. They are almost entirely composed of
ent granites, gneisses, and other crystalline rocks, along with various
tive rocks. To the north, underneath the loess, the prevailing rocks
ng to the Carboniferous system, while to the south there extends a
area of Jurassic strata embracing all the Red Basin. At various
es on both flanks of the dividing ranges, especially in the east, there
extensive deposits of what have been designated the Sinic (Chinese)
nations, which lie at the bottom of all the fossiliferous strata of
a, and are held to correspond with the Cambrian and Huronian
osits of Europe and America. These reappear largely along with
ent non-fossiliferous crystalline rocks in other mountainous regions
e country.

China is remarkably rich in minerals, above all in coal. In the
oniferous area of the north the Coal Measures crop out in many
es, and the largest known coal-field in the world is found among the
lands in the south-east of the province of Shansi, where thick seams
xcellent anthracite extend for a length of about 200 miles, with a
ing breadth. This region also abounds in fine iron ores, in limestone,
in potter's clays. The only drawback is the difficulty of access. The
of Shansi is almost equally rich in bituminous coal, and many detached
-fields are known to exist further west beyond the Hwang-ho. Other
l, but important coal-fields lie among the mountains both east and
of Peking, and in the west of Shantung. In the south of Hunan, on
rivers Siang and Lei, the deposits are much more important, for
ough the coal is not generally of very good quality, it is more largely
ed than anywhere else in China, owing to the ease with which it can
onveyed by water to the towns on the Yangtse. At various places on
ar the Yangtse there are other small coal-fields, and the province of
wan is very rich in coal of post-Carboniferous age, which is largely
d and carried by river to different parts of the Red Basin. Among
important minerals may be noticed copper, which is scattered all
Yunnan, a province which also contains silver, lead, tin and gold
tin in an isolated high valley, not far from the frontier of Tong-
in the south-east, the gold in the south of the province. Salt
s in the south-west of Shansi, near the abrupt angle of the
ng-ho, in the middle of the Red Basin, and in the south-west of
an.

Climate.—The main characteristics of the climate of China depend,
upon its situation on the east side of the greatest land-mass in the tem
e zone of the northern hemisphere, and second, upon its situation within

the region subject to monsoon winds. The first of these circumsta explains the character of its climate as regards temperature. Throug it is a country of extremes, or at least of a high range of temperature summers alternating with cold winters, though, of course, the extreme much greater in the north than in the south, where part of the surface within the torrid zone. The temperature in January averages 55° at Ca in the south, and only 23° at Peking in the north, while in July the ave for Canton is 82°, and for Peking 79°; the average for the whole ye 17° lower at the northern than at the southern station. Throughout C there is that predominance of summer r which is one of the distinguishing feat of monsoon areas, but the contrast tween winter and summer rain is n more marked in the north and south it is in middle China. This alterna of rainy and dry seasons necess brings about a corresponding alterna of high and low water in the rivers, where the physical configuration lead multitude of streams into one channel differences between the summer and wi level in the main river are enormous. Ichang, just below the rapids of Yangtse, a difference of nearly 48 has been observed in the level the river, and the ordinary an difference is not less than 40 feet. period of high water lasts from beginning of July to the early part October.

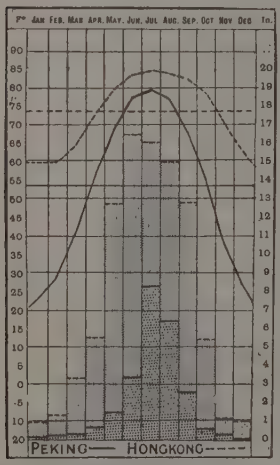

FIG. 266.—*Temperature and Rainfall Curves for Peking and Hongkong.*

Flora and Fauna.—Among the native vegetable products the place may be assigned to the bamboo, not, of course, as being peculia this country, but on account of its universal practical importance, e cially in the south. More peculiarly Chinese are the wax tree, the tal tree, the paper mulberry, the camphor and varnish trees, cassia, and sweet orange, which was introduced from China into Europe only a direct trade had been established by the Portuguese. One of the most n worthy circumstances regarding cultivated products is that the coincide of the rains with summer temperatures enables some crops that are most parts of the world confined to tropical and sub-tropical latitudes be grown with success in northern China. Hence cotton is as charac istic of this part of the country as wheat and the ordinary Europ cereals, together with beans and other pulses. Opium also is now largely tivated in the extreme north. In southern China the characteristic produ are rice (grown even in the high valleys of Yunnan at 6,000 feet

rds), tea, silk, sugar, and opium. Besides the silk obtained from rms" fed on the leaves of mulberries cultivated for the purpose, large rapidly increasing quantities of silk are obtained from wild caters which feed on the leaves of forest trees; chiefly in the north where sive forests are still found.

the greater part of China the larger wild animals have been minated by the progress of civilisation, but in the wilder mountus tracts there are elephants, rhinoceroses, and tapirs, a peculiar es of tiger, several kinds of leopards, bears, and badgers, and es in some parts, *e.g.*, Yunnan, are still numerous, bold and uctive.

he Chinese fisheries both in the sea and inland waters are very prove; a characteristic mode of fishing is with the aid of cormorants, n are prevented from swallowing the large fish that they catch by or pieces of string round their necks. In the inland waters the ding of fish for food is largely practised.

eople, History and Language.—The people, of Mongolian , who have spread their language, institutions, ideas, with remarkable success over so large diversified a country, are known to have been nally immigrants. They entered the country very remote period, thousands of years before hristian era, by the north, and almost certainly e avenue known as the Yu-men (p. 523). The of their original seats is still a matter of dis- but it is generally admitted that they were in rn Asia, that the oases of Eastern Turkestan ed prolonged halting-places on their progress vards, and that accordingly they were skilled in tion work before they entered China. The first areas settled by in which they had room for expansion, and the first seats of empire the freely intercommunicating valleys of the Wei and the Fen nsi and Shansi). The empire was frequently divided, but whether under or several rulers the Chinese language and institutions gradually d eastwards and southwards. Not till after the building of the Great (212 B.C.) did it permanently extend beyond the Yangtse-kiang. In times the extension has been less by conquest than by the gradual ss of ousting by superior assiduity the non-Chinese races who were ssimilated and absorbed. Among the mountains in the south-west and there are still some considerable tracts occupied by unabsorbed and dued descendants of older inhabitants, generally known by terms of mpt applied by the Chinese as *Miautse* or *Mantse*.

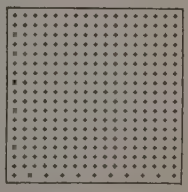

FIG. 267.—*Average population of a square mile of China Proper.*

he unity of the Chinese language is apparent rather in its written than spoken form. The writing is not alphabetic but ideographic—that is is a different character for every root idea. Hence the knowledge

of about ten thousand different signs is required for the complete kn
ledge of the Chinese language. These signs have the same meaning i
parts of the country, and even in Korea and Japan, but the equiva
sounds differ greatly in different dialects, just as the Arabic numerals h
the same meaning though different names in all European langua
The confusion of the spoken language is, however, to some ex
reduced by the fact that the educated classes generally speak an offi
dialect.

Government.—The government combines a high degree of cent
sation with the universal and long-established practice of popular gov
ment as regards local affairs. The central government is imperial, and
dignity of Emperor is hereditary in the reigning family, though not by
fixed rule of descent. The reigning emperor has the right to nominate
successor. The present dynasty, dating from 1644, is of Manchu ori
It was by this dynasty that the Manchu custom now universal in China
wearing the hair hanging down behind plaited into a long queue, or "
tail," was introduced. All government officials, known to European
Mandarins (a term of Portuguese origin), are appointed in the emper
name, but must be selected from those who h
passed the necessary public examinations, wh
are open to all, and are more or less severe
cording to the rank for which they qualify.
Chinese institutions concur in impressing on
people respect for authority and the establis
order. None is more influential in this res
than the system of examination, for all of
examinations test merely the knowledge of
ancient Chinese classics first systematised by Confucius, and give
encouragement to the spirit of scientific inquiry.

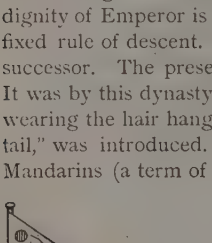

FIG. 268.—*Chinese Imperial Standard.*

What may be called the universal religion of China is a form of ance
worship inculcated in these classics, and no religion incompatible with
idea has obtained a wide hold on the Chinese. The Buddhism of In
and the native Taoism have both proved thus adaptable, and have m
adherents. But this is not so with Mohammedanism, which is professed
some millions in the north-west and south-west, and Christianity, wh
counts a few hundred thousand adherents, chiefly in the west; he
Christians and Moslems are looked upon as foreign elements by the g
body of the Chinese.

Industries and Trade.—The prevailing and most esteemed oc
pation in China is agriculture. In token of the honour in which this
dustry is held, every year at the vernal equinox, the emperor at the cap
and his representatives in other parts of the empire with their own ha
hold the plough and sow the seeds of the chief cereals. In every way
climate encourages farm work. The regular winters maintain the ene
of the people. The coincidence of warmth and moisture in summer inv

rewards the labour of the husbandman. Nowhere else in the world, haps, are such scenes of quiet but varied and charming rural industry ented as in some of the more favoured valleys of China. Pleasant farm-ses roofed with red or blue tiles are scattered about the valley bottom, midst the carefully cut terraces on the hill slopes. From the river, which there is a ceaseless coming and going of large and small boats, er is raised by waterwheels, driven by the labour of men or buffaloes, to a l above, from that to a second, a third, a fourth, a fifth, until it reaches tops of the hills, and it is made to impart life and freshness to every of soil in its descent. Seen from above, these canals seem like bands ilver encircling an infinite variety of green. In the most abundantly ated tracts there is the vivid and tender green of the rice-fields, or darker verdure of the sugar-cane. Elsewhere are tea-plantations, s of cotton decorated with their large yellow blossoms, rows of orange s, clumps of palms yielding fibres and other useful products, oil trees tallow trees, and many a thicket of bamboos with panicles waving in wind at the height of twenty to thirty feet above the ground.

Chinese manufactures are for the most part domestic, and the few that long been localised and carried on on a large e are mainly those dependent on supplies of eral products such as potter's clay (including a-clay) and iron ore. The principal textiles he country—silk, cotton, and rhea fibre or a grass, the last being largely used for summer ing—are mainly worked up by the women at e or in small establishments. Quite recently pean influence has led to the introduction of n machinery; silk filatures worked by steam have been set up in the producing provinces, and cotton mills have been erected round ghai and elsewhere with such success as to give great promise of d progress.

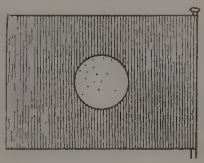

FIG. 269.—*Chinese Merchant Service Flag.*

The only important articles of export from China are such as have a value in proportion to their bulk, or such as can be produced in con-rable quantity within no great distance of the seaboard or the great rway of the Yangtse. For thousands of years silk and silk fabrics held the first place of importance. Almost equally long, porcelain, a ese invention, has been an important export to the west, though now the industry has been introduced elsewhere it takes a subordinate e. During the nineteenth century the second (occasionally the first) has belonged to tea, which still holds that rank among the exports, gh latterly the amount exported has diminished in consequence of the e competition of India and Ceylon. Much of the tea is exported by large quantities of it being compressed into "bricks" or "tablets." e-tea is usually of inferior quality, and is chiefly consumed in Tibet Mongolia; but tablet-tea is of high quality and finds its chief market

in Russia. Among other noteworthy exports are raw cotton (chiefly s to Japan), beans and bean cake, straw braid, mats and matting, skins, hi and furs. The chief imports are cotton yarn and tissues, opium, ri metals, and a variety of manufactured articles, including in recent ye rapidly increasing quantities of machinery. Foreigners are allowed settle for trade and introduce goods directly only at certain ports, mo fixed by successive treaties since 1842, and hence known as treaty-po these are now thirty-four in number. The collection of the customs these ports is entrusted to a foreign board, called the Imperial Mariti Customs, the head of which is an Englishman.

Means of Communication.—The cause of the limitation of exports of China is the remarkable defectiveness of the means of inter communication, except where there are convenient waterways. In north China such waterways are the exception, though during the summer seve rivers, ultimately uniting in the Pei-ho above Tientsin, are available transport. The great northern river, the Hwang-ho, is too rapid and shallow to be a convenient waterway, and is navigated only by small bo in sections of its course. An important artificial waterway, the Grand Imperial Canal, runs from Hangchou in the south to Tientsin in the no It was constructed early in the seventh century, chiefly for the conveya of rice from the southern provinces as an imperial tribute, and it still fo a fine waterway navigable by boats of at least five feet draught in southern section as far as the old bed of the Hwang-ho. In south China, including all the basin of the Yangtse, the rivers are the princi means of communication, but many of them have their courses so impe by rapids that the cost of transport is greatly raised, and navigation rendered so difficult that hardly anywhere out of China would it conti to be practised at all. The one great inland waterway is the Yangtse, wh is without a parallel in the world in respect of the length of navigatio offers for ocean steamers through a densely peopled country. Vessels over 1,000 tons burden can reach Hankow, 680 miles, or three days' ste from the sea. Steamers of about 600 tons can ascend to Ichang, just be the rapids, while 150-ton boats are the largest that can pass the rap The ascent of the last stretch, about 400 miles, takes nearly three we A further difficulty is created by the fact that the stretch between Hank and Ichang is easiest at high water, while the rapids can scarcely ascended at all during that period. The Han, a great left bank tribut of the Yangtse, is comparatively easy of navigation in its lower cou where it flows in a southerly or south-easterly direction, but not higher Of the southern tributaries the best waterway is the Siang-kiang, the ch feeder of the Tungting Lake. It is said to offer a course ten feet in de as high as Hengchou, about 140 miles due south of the lake, but ab that rapids are numerous, as they are also in the Kan-kiang, the co sponding southerly feeder of the Poyang Lake. The navigation of Si-kiang is much impeded by rapids above Wuchou.

Roads fit for cart traffic are very rare in the south, the principal wheeled cles being wheelbarrows. In northern China roads for cart traffic are common, except among the mountains, where the few roads of this run in many places through long defiles so narrow that two carts ot pass. In all parts of China accordingly the chief means of trans- where boats cannot be used, are pack animals (including camels in orth) and human porters. Hence, in spite of the extremely low cost of g, and the very small wages of labour, the cost of transport, where is not good water carriage, is high, generally at least two or three s as high as in countries provided with railways.

he introduction of railways was long opposed by the official classes regarded with dislike by the people. The first railway laid in China, from Wusung to Shanghai, opened in 1876, was bought up and oyed by the authorities in the year following. But this opposition has t given way. Railways now run from Taku at the mouth of the Pei-ho e Kaiping collieries, which have for many years been worked under pean management, and thence through Shanhaikwan to Sinmin-tung Niuchwang, and from Taku to Tientsin and Peking. The railway from ung to Shanghai has been relaid and was reopened in 1898. Great ay schemes have received official sanction. Among these are a line Peking to Hankow, already partly completed, from which there is to connection by rail with the great anthracite field of Shansi, another Peking southwards to Shanghai and Ningpo, one from Hankow to on, and one from Kaulun (opposite the island of Hongkong) to the port. Telegraphs have for some years extended to the remotest of the empire.

THE PROVINCES OF CHINA PROPER

echili or Chili is the north-eastern province of China. It is naturally ed into two parts, that within and that beyond the Great Wall. The er portion is made up of the northern part of the great plain, and gs mostly to the basin of the Pei-ho. Its western frontier lies id the plain, and is marked by er great wall running south along mountains. It contains *Peking*, the l of a kingdom as far back as 1100 nd of the Chinese Empire as early 1 A.D, but not without intermission. ntirely rectangular in shape, and is osed of two parts, a square to the forming the Manchu city and en- g the imperial quarters, and a more ive oblong quadrangle to the south forming the Chinese city. It a somewhat dreary alluvial sandy plain, swept in winter by cold den winds; but it has the advantage of a good site strategically, as

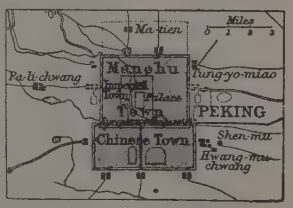

FIG. 270.—*Peking.*

it commands the roads leading north-west through the Nankow Pass, narrow for carts, and thence into Mongolia through Kalgan or Changkial north-east through the Kupei-kou Gate in the Great Wall to Chengt Jehol which contains the summer-palace of the emperor, and east-wa along the base of the mountains to the narrow pass between sea mountains at Shanhaikwan ("Mountain-sea-gate") which forms the entra to Manchuria. Even more populous than Peking is *Tientsin(-fu)*[1] on Pei-ho, the port of Peking, a treaty-port, and the northern terminus of Grand Canal.

Shansi ("Western Mountains") is the province to the west of Pec and, like it, is divided into two portions by the Great Wall, but in this c both portions are alike mountainous, and for the most part spar peopled, the chief natural resources consisting in the mineral we above described. In the west this province has an unmistakable nat boundary in the profound gorge of the Hwang-ho, and the same ri forms part of the boundary on the south-west. An important feature the province is a line of narrow valleys running from north to so through the middle, in the central and largest expansion of which sta *Taiyuen(-fu)*, the capital of the province.

The province of **Shensi** adjoins Shansi on the west. Its most popul area is the valley of the Wei, but though this valley has such a mar physical barrier on the south, the province includes also the valley of upper Han beyond that barrier, extending as far as the mountains bor ing the Red Basin. In the Wei valley stands the capital of the provi *Singan(-fu)*, the site of which makes it of necessity a great centre account of commanding the main through routes from north-west to east and south-east. When the main lines of railway are all made in Ch they must include lines along all the existing routes, the north-western forming the only possible connection between central China and west Siberia, so that Singan is bound to be reinvigorated. The inhabita show a business capacity and enterprise answering to the advantage the situation, and own many of the most important industrial establ ments in distant parts of China.

Kansu is a mountainous province with deep valleys and loess gor reaching in the north-west just to the end of the Great Wall. Its capi *Lanchou(-fu)*, stands on the great north-western road, on the right or so bank of the Hwang-ho, close to the point where that river begins its g northern bend. It is noted for its tobacco factories, most of which bel to the capitalists of Singan.

Shantung ("Eastern Mountains") includes, beside the mountain peninsula to which it owes its name, a belt of populous plain swathing mountains round on the west. The capital is *Tsinan(-fu)* at the no western margin of the hill country, a short distance from the Hwang-

[1] The termination in parenthesis (*-fu*, *-hien*) merely indicates the status of the t and is often omitted.

mountainous part has a much indented coast-line. On one of the hern bays is the small treaty-port of *Chifu*(*-hien*), another further east forms the British naval station of Weihaiwei (acquired in 1898). On south the chief inlet, Kiau-chou Bay, was leased to Germany in 1897.

Honan in the east occupies all of the great plain south of Pechili, and he west it consists of mainly mountainous country. It is traversed in north by the Hwang-ho, and south of that river by the numerous head-ams of the Hwai and its tributaries. The capital is *Kaifeng*(*-fu*) in the n, on the great road from Peking to Hankow, about eight miles south of Hwang-ho. In the west *Honan*(*-fu*) stands in a fertile valley amidst mountains just south of the Hwang-ho.

Kiangsu includes all the low flat seaboard studded with large and l lakes extending from the north-eastern shore of Hangchou Bay to ntung. It is thus divided into two parts by the wide estuary of the gtse, the smaller southern portion, which includes the last spurs of the -shan, being by much the richer and more populous. In this portion e busiest of all the treaty-ports, *Shanghai*(*-hien*), the great *entrepôt* for orthern China. It is, in fact, the outlet of the whole Yangtse valley, gh not situated on the river itself, whose low and silted shores afford ite for a great port, but twelve miles up the Wusung river, the one vback to which is a bar at the mouth with a depth at high water of nary spring tides of only 23½ feet and 20 feet at neap tides. Here e chief Chinese arsenal. In the same part are the great silk-manufac-ng towns of *Suchou* (*-fu*) on the Grand Canal, and *Nanking*(*-fu*), the latter he Yangtse, at the west end of a chain of hills stretching from the nd Canal, the capital of the province, and for about a century before 1421 capital of the empire. It was once a magnificent city celebrated for orcelain tower, which was destroyed by the Taiping rebels who held own from 1853 to 1864. It contains another Chinese arsenal.

Nganhwei is the province to the west on both banks of the Yangtse, ersed in the north also by the navigable portion of the Hwai. Its al is *Nganking*(*-fu*), on the left bank of the Yangtse, 100 miles directly n-west of Nanking ; its treaty-port is *Wuhu*(*-hien*), on the right bank of iver, about forty miles from the same city.

Kiangsi, south-west of the previous province, is almost identical with lrainage area of the Poyang Lake. It is a great tea-producing district. apital is *Nanchang*(*-fu*) on the Kan-kiang, not far from the south shore e lake at its summer level. North-east of the lake is *Kingtechen*(*-hien*), rincipal place of manufacture of earthenware in China, and the seat e imperial porcelain factory. Its treaty-port is *Kiukiang*(*-fu*) on the tse.

unan is a similar province to the west, corresponding closely with rainage area of the Tungting Lake. Its capital is *Changsha*(*-fu*) on the , thirty miles south of the lake. *Siangtan*, on the same river, is reported one of the largest cities in China, and is a great centre of the drug

trade. *Yochou(-fu)* at the outlet of the Tungting Lake, not far from Yangtse, is a treaty-port opened in 1898.

Hupe, to the north of both the last mentioned provinces, compr the whole of the plain of the middle Yangtse, except what belongs to basin of the Tungting Lake, along with a mountainous region to the w The capital is *Wuchang(-fu)*, a treaty port at the north end of a rang hills on the right bank of the Yangtse near the north end of one of chief bends of that river, directly opposite the confluence of the Han. is one of three towns enjoying the advantages of the same commer situation, the other two being *Hanyang(-fu)*, at the mouth of the Han the right bank, and the treaty-port *Hankow(-hien)* opposite the latter on left bank, all of which are at the meeting-place of great waterways fr the south-east (up the Yangtse), south-west (down the Yangtse), west, a north-west. This situation gives these towns, whose aggregate populat is not less than 1,200,000 (according to some estimates more than twice much), commercial importance not only for the adjacent country but a for more distant provinces, and they have the greatest river traffic of a place in China, probably in the world. *Shasi* or *Shashi(-hien)*, a trea port on the Yangtse, higher up, at the west end of a waterway connect that river with the Han, is the chief market for cottons in central Chi and *Ichang(-fu)* is a treaty port at the lower end of the Yangtse gorg

Sechwan extends westward from Hupe to the frontier of China, a includes nearly all the Red Basin, together with a mountainous region the west extending beyond the Yangtse (here called the Kinsha-kiang River of Golden Sand), the borders being sparsely peopled and inhabited a non-Chinese (Tibetan) population. Its capital is *Chengtu(-fu)* situa near the margin of the Red Basin in a rich alluvial plain about 2,400 squ miles in extent, irrigated in every part by works constructed about 2 B.C., and ever since carefully maintained. The chief river port of t province is *Chungking(-fu)* now a treaty-port, situated at the confluence the Kialing-kiang or Siao-ho (Little River) with the Yangtse, the one o let eastwards of the trade of the province. It was reached by a Brit steamer, the first to ascend the rapids of the Yangtse, in March, 1898. the south-west of the alluvial plain of *Chengtu(-fu)* is *Yachou(-fu)* a gr centre of the trade in brick-tea with Tibet and central Asia, but most the factories belong to capitalists of Singan. The province of Sechw includes the chief towns of the elevated, and in its first stages very difficu trade route leading westwards to Lhasa.

Kweichou is the mountainous province to the south-east of Sechw containing headstreams of rivers draining to the Yangtse and to the kiang. Its capital is *Kweiyang(-fu)* on a small central plain.

Yunnan comprises nearly all the rugged elevated region, rich only minerals, in the south-west of China, together with marginal portions the surrounding valleys. Its two chief towns lie on the shores of its t chief lakes; its capital *Yunnan(-fu)*, at the north end of a lake near t

lle, centralises the trade of the province with Tongking; the second , *Tali(-fu)*, is important for the trade with Burma, and stands on the side of the lake called Erh-hai, in the west of the province. In the n is *Sumao*, the centre of trade in Puerh tea, which enjoys the highest tation throughout China.

East of Yunnan are two provinces comprising most of the basin of Si-kiang, **Kwangsi** and **Kwangtung** ("the western" and "the ern Kwang"). Kwangsi is mainly a rugged, poor and sparsely peopled ince, whereas Kwangtung has always been one of the richest parts of empire, containing as it does the largest and most densely peopled ical delta east of the Ganges. It is this delta which has always given ortance to Canton, the great southern seaport of China, for the sake of trade with which the Portuguese sought and obtained possession of ao in 1586 and the British of Hongkong in 1842. *Canton*, in Chinese *ngchou(-fu)*, Canton being a Portuguese corruption, is a town most bly situated at the west end of a series of hills, where the Canton earl river affords a channel to the south for ocean vessels, the Si-kiang s a waterway to the west for steamers drawing seven or eight feet as as the treaty-port of *Wuchou(-fu)* in the adjoining province, the g-kiang, or East River, forms a navigable channel to the east, and the ho, or North River, leads to the northern confines of the province, and e by a fortunate arrangement of the physical features forks into two rways, one leading north-west so as to communicate by a low water- ing and short portage with the main waterway of Hunan, the other h-east so as to communicate similarly with that of Kiangsi. About boo of the inhabitants of Canton live in boats moored in the .

Fokien, or Fukien, is a rich tea-growing maritime province with a much nted coast line to the north-east of Kwantung, having as its capital the ent city of *Fuchou(-fu)*, a treaty-port at the mouth of the Min. There nother treaty-port, *Amoy*, in the south-east, and a third, *Funing(-fu)*, ed in 1898, in the north-east.

hekiang is a similar province further to the north-east, extending to chou Bay, of which it embraces both sides at the northern end. Its ern part is drained by the Tsientang-kiang, remarkable for the nce of its tidal bore. It has three treaty-ports, *Hangchou(-fu)*, the al of the province, at the head of the bay, *Ningpo(-fu)* on a creek e south side of the bay, and *Wenchou(-fu)* in the south-east of the nce.

tatistics of China.—The censuses that have been taken of China oo untrustworthy, and the estimates of population too uncertain for omparison of estimates at different dates to serve any useful purpose. utmost that can be said is that it is not improbable that the total ation of China Proper may amount to as much as 350 million or even . Neither can statistical returns of the value of the external commerce

be drawn up so as to allow of a comparison of different periods, for returns collected by the Imperial Maritime Customs now always inclu those for native junks, but these are not obtainable before 1887.

STATISTICS OF CHINA PROPER.

(*Approximate for* 1891–95.)

Area in square miles	1,300,000
Population	350,000,000
Density of population per square mile	270

PROBABLE POPULATIONS OF SOME IMPORTANT TOWNS.

Canton	1,600,000	Peking	500,000	Kaifeng	200,000
Hankow	1,500,000	Shasi	500,000	Tsinan	200,000
Tientsin	1,000,000	Suchou	500,000	Wuchou	200,000
Siangtan	1,000,000	Wuchang	450,000	Chinkiang	140,000
Chengtu	800,000	Shanghai	350,000	Nanking	130,000
Singan	700,000	Changsha	300,000	Chifu	120,000
Fuchou	650,000	Chungking	250,000	Amoy	100,000
Hangchou	500,000	Ningpo	250,000	Wenchou	80,000
Lanchou	500,000	Taiyuen	250,000		

ANNUAL TRADE (*in dollars, for* 1891–95).

Imports	146,000,000
Exports	149,000,000

II.—EUROPEAN POSSESSIONS IN CHINA

Hongkong.[1]—Hongkong (Hang-kiang, "fragrant streams") is o of the small islands off the Chinese coast, east of the mouth of t Canton River, nearly in the position of 22° N. and 114° E., and o separated from the mainland by a channel half a mile wide. The isla was acquired as a Brit colony in 1841, and 1861 the southern porti of the Kaulun (Kowloo Peninsula, on the oppos mainland, was added. 1898, the whole of t large peninsula formi the southern part Kwangtung provin was leased from Chi so as to secure the d fences.

FIG. 271.—*Hongkong and Kaulun.* (*The map includes* 48 *miles by* 37.)

Surface and R sources of Hon kong.—The northe coast with the oppos mainland encloses one of the finest harbours in the world, cover an area of about 10 square miles, and on this the prosperity of t colony entirely depends. The island is composed of igneous rocks, gran and basalts. It is traversed east and west by hill ridges, intersected

[1] By the Editor, assisted by E. J. Hastings.

essions or "gaps," and rising in Victoria Peak, the highest point, to ; feet. The only product of importance is granite, which is extensively ried. Forests which formerly covered the island have been completely roved, but a system of reafforesting is being successfully carried out. climate is hot, but subject to great variations, the mean monthly perature ranging between 40° and 90° F. During the winter months, ember to March, the air is pleasant and bracing. The average rainfall out 90 inches. Hongkong has outlived its old, evil reputation as an edingly unhealthy place.

People and Government of Hongkong.—The native population ists chiefly of Chinese, about one-third of whom are British subjects irth. Natives of India form a small proportion. Besides the members e British naval and military establishments, there are representatives arious nationalities, as Hongkong is the greatest traffic centre on Chinese coast. The government is that of a Crown Colony, the ernor being assisted by a nominated Legislative Council. The city aulun in the leased territory is exempt from direct ish jurisdiction. Hongkong is a very important egic point, commanding the approach to Canton, miles distant. It is strongly fortified, and is the dquarters of the British naval squadron in Chinese ers. It is also a great commercial emporium, an olutely free port without any Custom House, and e principal distributing centre for European pro- s in the Far East. The United Kingdom has the est share in the trade, which is really part of the e of China. The chief imports from Europe are cotton goods, and the f exports tea, silk, and hemp from China.

FIG. 272. — *Badge of the Colony of Hongkong.*

Victoria, the capital, stretches along the north shore of the island for t four miles, and rises in terraces up the sides of Victoria Peak, some e garden-enclosed residences being as high as 600 feet. The town ains several fine public buildings. The Praya, or main street, runs g the shore, and for about two miles of its central part is protected e Praya sea-wall, specially constructed to withstand the force of the oons which sometimes sweep along the coast, and provided with fage for the ocean liners and other vessels calling at the port. Six s and large workshops afford every requirement for the repair of naval and mercantile ships. The movement of the port, excluding e junks, is over 14,000,000 tons of shipping entered and cleared ally, a figure only equalled by two or three seaports in the world.

STATISTICS.

	1881.	1891.	1901.
rea of Hongkong (square miles)	30	30	30
opulation of Hongkong	160,402	221,441	283,975
ensity of populat on per square mile ..	5,346	7,381	9,466
rea of leased territory in Kwangtung ..	—	—	376
opulation of leased territory	—	—	100,000

Macao.[1]—Macao, the only Portuguese possession in China, practica consists of the city of that name, on an island at the mouth of the Can river. It may be called a commercial colony of average prosperity. T islands of Taipa and Coloane, important fishing centres, are under t same administration. Macao is a healthy town with fine streets and bui ings. The mean temperature is 73° F. It has belonged to Portugal sin 1586, and is by far the oldest of the European possessions in China. T population of the town, which is a centre of the opium trade, is 78,000.

Kiau-chou.[2]—Kiau-chou, in lat. 36° S., 120° E. long., is a large bay 180 square miles area on the southern coast of the peninsula of Shantu It takes its name from the "Glue city," 22 miles north of it. The Kiau ri coming from the mountains in the eastern portion of Shantung brings do much sand, which causes the bay to silt up. The entrance of the bay, b tween two narrow spits of land, is about two miles wide and 20 fathoms de The landspits, together with the islands in the bay, are leased by Germa from China, while the German sphere of interest extends all round the b for a distance of 31 miles (50 kilometres). The climate is excellent, a

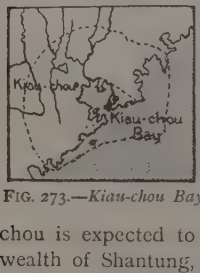

FIG. 273.—*Kiau-chou Bay.*

quite that of the temperate zone; ice occurs winter, but as it hardly ever covers the bay it d not form such an impediment to navigation as t fogs which are frequent on the coast further sou from which Kiau-chou is perfectly free. The great rainfall occurs in July and August. The inhabita are agriculturists who have carried a system irrigation to great perfection. The tidiness of th settlements is a mark of their prosperity. Kia chou is expected to prove valuable as an outlet for the great miner wealth of Shantung, and the railway intended to run round the base the western mountains of Shantung is now completed from *Tsingtau* beyond *Wei(-hien)*.

III.—REMOTE PROVINCES OF THE CHINESE EMPIRE

Manchuria.—Manchuria lies to the north-east of China Proper, a is made up of three provinces, Shengking in the south, Kirin in the midd and Helungkiang in the north. Shengking consists of the broad val of the lower Liau stretching upwards of 200 miles north-eastwards betwe bare mountains in the west and forest-clad mountains with fertile alluv valleys in the east. The southern portion of the main valley is a dreary sal tract, but there is more fertile country further north. *Mukden*, situated the base of the hills, on a tributary of the Liau-ho, is the capital of the p vince and country. At the mouth of the Liau is the so-called treaty-p of *Niuchwang* (*Newchwang*), the town of Niuchwang being situated son what inland. The extremity of the mountainous peninsula of Liautu

[1] By Captain Ernesto de Vasconcellos. [2] By Graf von Pfeil.

ast of the Liau "), called Kwantung, was leased to Russia; here are the l station and arsenal of *Port Arthur*, together with *Talienwan* and the port *Dalni*, all three being termini of the trans-Manchurian railway (see 222), and now in the occupation of Japan.

The northern provinces lying to the east of the Khingan mountains are posed of the rich valleys of the Sungari, Nonni (a left bank tributary ie Sungari) and Usuri, all navigable streams. The chief towns are *Kirin* nore properly Girin[1]) at the head of navigation on the Sungari, and *ihar* at that of the Nonni. The population of Manchuria is variously nated at from 15 to 23 millions, the great bulk being in the southern ince. For many years there has been a steady stream of immigration n China Proper, and Chinese now form the great mass of the popu- n of the provinces. In recent years the flow of immigrants into the hern provinces has been peculiarly rapid. Russian influence is now mount, and is being made permanent by the railways (p. 419).

Mongolia.—Mongolia is the vast region surrounding the desert of i or Shamo, the latter term being Chinese, and signifying Sea of Sand, gh the region is for the most part sufficiently moistened by summer s to produce a fair amount of pasture and fodder-shrubs for sheep, horses camels. The altitude of the Gobi is from 3,000 to 3,300 feet. The l settlements of Mongolia are chiefly in the north, where it is traversed xtensive spurs from the Altai, Tian Shan, Sayan, and Yablonovyi ntains. The chief trade routes are from Kalgan in Pechili and Kwei- cheng in northern Shansi, northwards by *Urga* to *Maimachin* on the t bank of the Amur opposite Kyakhta, and north-westwards by *Uliasutai* *Kobdo* to western Siberia. The inhabitants, from whom the region s its name, are mainly Buddhists in religion, and are now a peaceable engaged chiefly in the rearing of sheep, camels, horses and other ials, and having none of the qualities which rendered their ancestors so idable throughout Asia and Europe in the thirteenth century under hiz Khan and his successors.

Eastern Turkestan.—Sinkiang, or Sintsiang, is the name now given ie province comprising all the rest of Chinese Central Asia north of t. It is naturally divided into two sections by the Tian Shan range, garia, by much the larger, to the south, and Dzungaria to the north. Cashgaria the population is for the most part settled in irrigated oases ie banks of rivers at the base of the Kwen-lun and Altyn Tagh, the rs and the Tian Shan; but in the east there is another series of oases een 94° and 96° E. due to the existence of wells stretching from isichou, or Ansifan, in the south to *Hami* in the north. This chain of ing places forms the shortest route across the dreary waste of sand, s the direct continuation of the great north-western highroad of China. ward the route is continued either south of the Tian Shan by the oases

[1] Manchurian, *Girin*; Chinese, *Kilin*; Kirin is neither.

of Turfan, Karashahr, and Kuchar to Kashgar (the Tien-shan-nan-lu or T
Shan south road), or north of the Tian-shan by *Barkul* and *Urumtsi*
Urumchi) to Kulja in the fertile valley of the Ili. There is now no reg
trade route south of the desert in Kashgaria, but among the impor
oases here are Yarkand, Khotan, Keria and Cherchen in the order gi
from west to east.

The greater part of Kashgaria may be described as belonging to
basin of the Tarim, though many of the streams which give life to
oases dry up before reaching the main river. The Tarim flows along
north of the desert, and then curving south finally makes an abrupt tur
the east and terminates in the lake known as Lob (or Lop) Nor, at
altitude of about 2,200 feet. Although without outlet this lake cont
fresh water, a circumstance which can only be explained, as Dr. S
Hedin points out, by the fact of its very recent formation, the lake b
being frequently filled up by desert-sand, and forming afresh in a n
place. In its neighbourhood the wild horse and wild camel were found
the great Russian explorer Przhevalski, but it is questionable whet
these may not be descended from domestic animals escaped long ago fr
servitude. The wild ass which roams in great herds on the border
mountains to the south is undoubtedly native ; it is a fleet and grac
creature, larger than the common donkey. The interior of the Tarim ba
is a continuous succession of sand dunes slowly moving westwards.
their progress they have in the course of ages overwhelmed ancient cit
the ruins of which yield interesting relics of a long-forgotten civilisati
Two of these cities were recently found by Dr. Sven Hedin between
rivers Khotan and Keria ; and the latter stream was found to reach at h
water much further north than is represented on maps.

Kashgar, on the Kashgar river, one of the two chief headstreams of
Tarim, is the administrative capital and the chief centre of trade w
Russian Turkestan (across the Terek-davan and Terekti passes). *Yarka*
on the Yarkand-daria or Zerafshan, the second of the two chief headstrea
of the Tarim, is the chief centre of trade with Kashmir (across the Karakor
Pass), and is the rival of Kashgar in wealth and population. In the go
of the Pamirs through which the upper waters of this river flow is
place from which all the jade (nephrite) introduced into China was forme
obtained. *Khotan* is another populous oasis, and in the sixth and seve
centuries was the seat of a powerful kingdom. The total population
Sinkiang, consisting mainly of Mohammedans of Turki race and speech
about 1,000,000 or 1,500,000. Both in Mongolia and Sinkiang the gove
ment is mainly carried on through native rulers (Ambans) under
control of Chinese mandarins, and the principal centres are garrisoned
Chinese troops to guard against the revival of a native kingdom like that
Yakub-beg, who ruled Turkestan from 1869 to 1876.

Tibet.—The great plateau of Tibet, the most elevated region in t
world, stretches through about 12° of latitude (28° to 40°) between

alayas and the Kwen-lun, Altyn Tagh, and Nan-shan, and through 24°
ngitude (79° to 103° E.). It consists of extensive mountain-traversed high
s with an elevation of 14,000 to 17,000 feet in the west, and from 9,000
4,000 feet in the north-east; while in the east and south-east the
cate system of ranges and gorges containing the headstreams of the
Kong, the Yangtse, and the Hwang-ho form the border towards China.
nerous large lakes are scattered over the surface. Among them are
n-nor in the extreme north-east, Charing and Oring-nor on the head-
m of the Hwang-ho, Tengri-nor to the north and Palti or Yamdók-tso
ne south of Lhasa, and the two Manasarowar lakes in the extreme
n-west, the western of which is the source of the Indus. The climate
ecessarily bleak and inclement on account of the great altitude.
ntful snow-storms occur in winter, and agriculture of any kind is only
ble in the most sheltered valleys. The great bulk of the inhabitants
n the valley of the Tsanpo or Brahmaputra on the south, and in the
ys immediately adjoining, where barley, wheat and peas are grown,
ugh pastoral pursuits are the chief occupation of the country. The
a peculiar kind of ox), the sheep, and the goat all occur both wild and
esticated, and all three, besides horses and mules, are made use of as
s of burden. The people are of Mongolic stock, speak a peculiar
nage, are Buddhists (Lamaists) in religion, and are extremely exclusive.
idea of "making merit" by repeating prayers, or offering them
anically by prayer-wheels turned in the hand or actuated by wind or
r-power, possesses the Tibetan mind to the exclusion of all enterprise
dependent thought.

ven the Chinese control appears to be slight. The governing classes
n monasteries, which are said to contain a third of the population,
hus form a terrible burden on the rest of the inhabitants. Though
are Chinese resident officials, the government appears to be
ically exercised wholly in the name of the Dalai-Lama, who resides at
a, in one of the northern valleys tributary to the Brahmaputra, and
of the Teshu-Lama who lives further west just south of the Brahma-
. *Lhasa*, which is considered the capital of the whole country, had
entered by only three Europeans,—Mr. Manning in 1811–12, and MM.
and Gabet in 1845–46,—until it was temporarily occupied by a British
coming from India in 1904. It is a holy city, and a great centre
uddhist pilgrims. A large trade with India might probably be main-
l across the Himalayan passes by exporting wool, borax, perhaps
and other mineral products, in exchange for tea and manufactured
s, but this trade is greatly restricted by customs duties and other
cles, in consequence of which brick-tea of wretched quality is
ted by a most difficult route from China. Not till 1894 were
h subjects allowed to reside in any part of Thibet, but in that
residence was allowed at Yatong or Yatung, near the frontier of
n.

TABLE OF PROVINCES OF THE CHINESE EMPIRE.

	Area in square miles.
Pechili (within the wall)	57,916
Pechili (without the wall)	57,916
Shansi (within the wall)	66,410
Shansi (without the wall)	15,444
Shensi	75,291
Kansu	125,483
Shantung	55,985
Honan	67,955
Kiang-su	38,610
Nganhwei	54,826
Hupe	71,430
Kiangsi	69,499
Hunan	83,398
Chekiang	36,681
Fokien	46,332
Kwangtung	86,873
Hainan	13,166
Kwangsi	77,220
Kweichou	67,182
Yünnan	146,719
Sechwan	154,440
Total (China Proper, round numbers)	1,533,000
Manchuria	364,000
Mongolia	1,093,000
Sinkiang	550,000
Tibet	738,000
Grand Total, Chinese Empire (round numbers)	4,278,000

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KOREA

By Mrs. Bishop, F.R.G.S.

Name.—Korea, or Korai, is known locally as Ch'ao-sien (*Fresh m*
ing), but the name was changed officially in 1897 to Dai Han (*Great H*

Position and Extent.—Korea is a definite peninsula of no
eastern Asia, lying between 34° and 43° N., and between 124°
131° E. Its coast-line is roughly estimated at 1,740 miles, its len
at 600, and its extreme breadth at 135. Its eastern coast is steep
rocky, with deep water, few but excellent harbours, never ice-locked,
an insignificant tidal rise and fall. The western shores are mostly shely
and oft-times low, cut up by muddy estuaries, and fringing off int
remarkable archipelago with dangerous tideways, and the tidal rise
fall is from 20 to 38 feet. There is no lighthouse system. Many of
adjacent islands are fertile and inhabited, and Quelpart, on which is
volcanic cone of Hal-la-san (6,000 feet), has a large population, and bre
ponies to a considerable extent. The Tumen and Yalu rivers form
natural boundaries between Korea and Russia and Manchuria.

urface.—The general aspect of Korea is hilly. In the north there are
ral mountain groups with definite centres, Paik-u-san (8,000 feet), in
h both the boundary rivers rise, being the most important. A range
ing southwards from this centre divides Korea into two unequal
ons, the eastern being a narrow and fertile strip between the moun-
and the Sea of Japan, while the western consists of innumerable
and well watered valleys and slopes, lying among the lateral spurs
h the range throws off. The Korean mountains present striking
nples of denudation. The great axial range, forest-covered in the
h and for 40 miles of its passage through the Kang-wŏn province,
sually bare like the coasts, or is covered with oak and chestnut
b. Towards the southern coast it falls away into rocky hills and
uently into infertile plains. The lakes are few and insignificant, and
plains are of very limited extent. Mesozoic rocks occur, but granite
metamorphic rocks predominate. North-east of Seoul are very
nsive lava beds, and lava and volcanic rock occur frequently in the
h. The Han and Tai-dong flow frequently through limestone
nation. The rivers are numerous, shallow, and impetuous, and navi-
e only for a short distance from the sea. The exceptions are the
, Nak-tong, Mok-po, Tai-dong, and Han, which last, rising thirty
s from the Sea of Japan, after cutting Korea nearly in half reaches
sea on the west coast near Chemulpo, the port of Seoul and the
inus of the Seoul railroad, and in spite of many and severe rapids
important highway of trade for about 160 miles.

Resources and Climate.—The soil is rich, eminently fitted for
essful agriculture, and yields from two to four crops annually. The
all is ample and reliable, and irrigation is only necessary for the rice
. All cereals and root crops, as well as tobacco, cotton and hemp,
ish. The mineral wealth consists in rich but undeveloped iron and coal
s, silver, galena, copper, and gold, which though exported in consider-
quantities is obtained only by a rude form of washing. For more than
months of the year the climate is superb. The rainy season is hot
damp, but the heat is tempered by the sea breezes, and Europeans
their children are exempt from diseases of locality. The average
all at the capital is about 36 inches. The summers are hotter and
winters colder than those of central Japan.

People and History.—The Koreans are undoubtedly of the Tun-
stock. Their features are decidedly Mongolian. Their language
s widely from Chinese and Japanese. It is polysyllabic and possesses
phabet. The Koreans are physically a fine people, and mentally are
lly endowed. The earliest notice of the country is in a book, "Roads
ridges," by an Arab geographer, Khordadbeh, in the ninth century A.D.
radition, fairly worthy of credit, asserts that Korea was inhabited by
me race as at present when the Chinese General Kit-ze, after con-
ble conquests, introduced Chinese civilisation in the twelfth century

B.C. After many subsequent vicissitudes, the kingdoms of which Ko is composed were united under one monarch, and became tributary China until the war of 1894; after the Russo-Japanese war in 1905 Ko came under the protection of Japan. The government is a heredi and absolute monarchy of a strictly Oriental type, the Imperial Ed constituting law. There is a standing army of 6,000 men, clothed, dril and armed in European fashion. The chief sources of revenue are land tax and Customs duties. Korea is solvent. The Empire contain provinces and 340 prefectural districts. Goods are carried by land on backs of men, ponies and bulls. The roads are everywhere bad. A r road from Chemulpo to Seoul is being extended to Songdo and to Suw

FIG. 274.—*The Korean Flag.*

Korea has regular communication with Jap Russia, and China, chiefly by Japanese steam

Industries, Trade, Religion, Educati—Apart from agriculture, which claims th fourths of the population, the chief industries the manufacture of cotton and grass cloth, t silks, horse-hair gauze, salt, and iron and b utensils, all for native use. Rice, beans, hides, ginseng are exported. Cotton piece goods and cotton yarn are the c imports. Buddhism, introduced from China at an early period, has b discredited for three centuries. The officials observe the Confucian ri The real cult of the people is Dæmonism. Christianity is making rapid p gress. Education, though with some recent modifications, is on the Chin system, and consists in acquiring the Chinese ideographs and class The pure Korean language and script are used almost solely by the lo classes. The arts are *nil.* Korea has an efficient postal and telegr system. The country was closed to Europeans until 1882; but there are n ten open ports and a resident foreign population of about 22,000, o 16,000 being Japanese. Korean history since the war with China of 1894 been made up of reforms and retrograde movements. Trade has increa rapidly. The east and south coast fisheries are prolific, but are wor chiefly by Japanese. The fauna of Korea is headed by tigers and leopar The country is rich in native and migratory birds. The economic plants few, ginseng being the most important. *Seoul,* the capital, is the centre government and of all public interests. It is nearly without antiquities

STATISTICS (*Estimates*).

Estimated area of Korea (square miles)	82,000
Population of Korea by first census, 1897	17,000,000
Christian population in 1898	39,000
Population of Seoul, 1897	219,815
Total Exports from Korean open ports (1896–1900)	£700,000
Total Foreign Imports at Korean open ports (1896–1900)	£1,000,000

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CHAPTER XXIX.—JAPAN

By W. B. Mason,
Tokyo.

osition and Extent.—The Japanese call their country *Nihon* (in er form, Nippon) or *Dai Nippon*, which means "Great Japan," the of the Rising Sun. The chief islands which constitute Japan proper Ionshu, the central and largest (often erroneously called Nippon), ku, Kyushu, and Yezo, separated from each other by narrow straits. nost important islands in close proximity to them are Sado, Tsushima, nd Iki, in the Sea of Japan; the Goto group, and Amakusa in the nai, Awaji, in the Inland Sea; Tanegashima, and Yakunoshima, in the c. The Japanese possessions also include the Luchu group (*Ryukyu*), to the south-west of Kyushu; Formosa (*Taiwan*), and the Pescadores *o-to*), ceded to Japan after the war with China in 1894–5; the southern f Sakhalin acquired as a result of the war with Russia in 1905; the es (*Chishima*), extending in a north-westerly direction from Yezo to hatka, and a vast number of small islands, no less than 487 in all considered worthy of administrative recognition. The Bonin Islands *awara-jima*), a small and unimportant group, lying far off in the ern seas in about 24° N. and 140° E., are also ruled by the Japa- The main islands stretch along the east coast of the continent of n the form of a crescent, the northern horn of which turns in towards a, and the southern towards Korea. Between the two flows the Sea pan.

urface.—The eastern shores of the archipelago are washed by the s of the North Pacific Ocean, from whose immense depths rise range range of imposing mountain heights, often crowned by still more ing volcanic cones. But the islands are not solely of volcanic origin. of the higher formations are giant masses of granite overlaid with is rocks. Earthquakes, seismic-waves, and an excessively humid e have contributed, in no small degree, towards giving Japan its cha- istic physical features. In the Main Island the central mountain follows the trend of the land itself from north-east to south-west, various smaller ranges run parallel with or branch out from it, descending precipitously to the sea and forming bays and harbours e of sheltering the largest ships. Almost all are luxuriantly d, and the numberless valleys winding amongst them are culti- o the utmost limit. Solfataras and thermal springs of various kinds

FIG. 275.—*Japan*

abound in every part of
country. The chief mount
peaks comprise the famous
beautiful Fuji-san (12,400 fe
a perfect cone rising from
plain, the Hida-Echu ran
with Tateyama, Yari-ga-ta
Ontake, and others, all ab
10,000 feet above sea-level, a
another similar lofty ra
running from north to so
between the rivers Fujika
and Tenryu-gawa. The act
volcano of Asama-yama, in
province of Shinshu, attain
height of 8,280 feet. In Shik
the main system slopes towa
the Pacific on one side and
wards the Inland Sea on
other. Kyushu is likewise ve
mountainous. It possesses
notable active volcanoes, A
san (5,630 feet), rising from
bed of an ancient crater, s
to have the largest circu
ference of any in the wor
and Kirishima-yama (5,5
feet). There are also so
conspicuous volcanic cones
the island of Yezo. Fu
three-fourths of the area
Japan are mountainous, a
less than 16 per cent. und
cultivation.

Rivers.—The rivers mos
partake of the character
torrents. They cut their w
impetuously through de
rocky gorges and wood
ravines until they reach t
lower land, where, owing
the detritus carried down fr
the heights, their beds oft
attain a width of several mil
They are rarely navigable f

ut the shallowest craft, being for the greater part of the year little than fordable streams. It is only in late summer, after the close of a d of drought, that they assume dangerous proportions, the torrential causing them to rise from ten to fifteen feet above their normal height, pread destruction for many miles around. Of the few rivers of any n, the most noteworthy are the Tone-gawa which, rising in the province tsuke flows into the Pacific Ocean at Choshi, and has a remarkable n of lagoons near its mouth; the Shinano-gawa and the Kiso-gawa rise in the province of Shinshu, the former reaching the Sea of Japan iigata, the latter the Pacific Ocean, near Nagoya; the Kitakami- after traversing the provinces of Rikuchu and Rikuzen from to south, falls into the Bay of Sendai. The longest river in Yezo Ishikari-gawa, noted for its salmon. Lake Biwa, in the province ni, is the only large sheet of fresh water worthy of special mention. 36 miles long by 12 miles in width, its greatest depth about 300 feet; ts shores, which are classic ground to apanese, famous throughout the land eir beauty.

limate.—Japan, at one extreme, lies n the tropics, and at the other, though ouching the latitude of the south of and, experiences the rigours of arctic The climate of the chief islands is derably influenced by their proximity mainland of Asia and to the *Kuroshiwo*, ean current like the Gulf Stream, t carries the heated waters of the orial seas along the east coast of the elago, while a branch of the same, ng the Sea of Japan through the Strait rea, strikes the north-west coast of the main island. The prevailing being southerly in summer and northerly in winter, the effect of ocean currents is consequently greater upon the amount and distri- t of precipitation than upon the temperature. Snow falls in every n of the main islands, but, except on the west coast and the moun- does not lie for any length of time. Yezo alone remains snow-bound veral months, and even the sea freezes on a part of its coast. The t period is usually from the middle of July to the middle of Septem- Japan has an abundant rainfall. The wet weather sets in early in and with occasional intermissions, lasts until the beginning of t. Again, in September, at the end of the summer heat, heavy rains, mes accompanied by typhoons, or revolving storms, cause immense e to property. Thunderstorms are not frequent except in the ainous districts. The driest months are November, December, and y, when a clear sky with high barometer prevails on the Pacific side

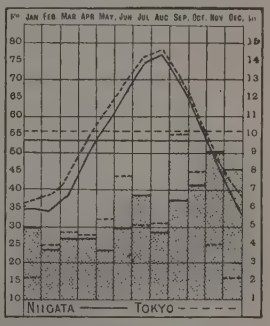

FIG. 276.—*Temperature and Rainfall Curves for Tokyo and Niigata.*

and dull, dense masses of cloud lie over the Sea of Japan. A cold, a current which sweeps past the Kuriles causes the east coast of Yezo and north-east of the main island to be enveloped in fog for a large portio the summer months. At Tokyo the mean temperature for twenty y (1876–95) shows an average of 57° F.; the absolute maximum temp ture during the same period was 98° F., and the absolute minim temperature 15° F. The mean yearly rainfall amounted to 58 inche

Mineral Resources.—The chief mineral productions of Ja are gold, silver, copper, iron, antimony, and coal. The more prec metals occur in small quantities, and the ore is generally poor. Co has always been, and still continues to be, the most abundant as we the purest of Japanese metals, the mines of Ashio, near Nikko, being largest in Asia. The output of antimony from the island of Shikoku rea a high figure. The richest coal-fields are found in Kyushu and in Y Very little stone is employed for building purposes.

Flora.—A climate ranging from the temperate to the tropical give extraordinary luxuriance to the Japanese flora. The bamboo and the s palm flourish even in the latitude of Tokyo. The pine, elm, chestnut, oak are common, while the beech is found in the north and on the hig elevations. Amongst Japan's most picturesque trees is the *Cryptom japonica* (a kind of cedar) which borders the ancient highways and approaches to celebrated shrines. It often attains gigantic dimension does also the camphor laurel. The wax-tree (*Rhus succedanea*) support important branch of industry in Kyushu and the southern half of the m island. Other valuable trees are the paper-mulberry and the lacquer-t The cherry and plum are cultivated chiefly for their blossoms. Persimm and oranges rank amongst the most characteristic of Japanese fruits, apples, pears, peaches and figs which are grown being mostly of inferior description. The tea-plant flourishes best in central Japan. profusion of wild flowers carpets the moors in summer, while the m and other deciduous trees make the hillsides glow with their chang colour in autumn. Rice, barley and millet are the staple cereals.

Fauna.—The fauna of Japan furnishes numerous types to prove connection of the islands with the continents of Asia and America in rem geological times. Bears still roam in the wilds of Yezo, and with the w boar, wild deer, and the monkey, are occasionally to be met with in mountain fastnesses of the main island. The fox and the badger pla important part in folk-lore; but wild animals are far from numerous. Am the rodents may be named the squirrel and the hare, while the rat is ev where a common plague. Domestic animals include the horse, cow, pig, and cat. Sheep have been imported, but do not thrive. Of the numer species of birds only the lark and the *uguisu* (a species of nightingale) br the silence of the moors and valleys with song. Snakes, large and sm abound, but are mostly harmless. The Japanese seas teem with fish. *tai* (a kind of bream), and the *maguro*, a large red-fleshed fish, calling

al mention, as both are highly esteemed for food, and often eaten raw. ng fresh-water fish the salmon and the *masu* (*Salmo japonicus*) swarm me of the northern rivers. The *ai*, a kind of trout, is common Japanese rivers. Insect life is abundant and varied; particularly iful in colour are the moths and butterflies. Mosquitoes and fleas all parts of the country.

eople and Language.—The origin of the Japanese people is own, but learned opinion generally agrees in regarding them as the of two or three different tides of Tatâro-Mongolian immigration flowed to Japan by way of the Korean peninsula. Before the advent se settlers the land was inhabited by the Ainu aborigines, a hairy race, in their turn, must have come from the neighbouring continent. At resent day, having been gradually driven northwards by the more etic race, and unable, like other aboriginal tribes, to exist under ed conditions, they are only to be found, in ever-decreasing numbers, island of Yezo and the adjacent Kurile Islands. That much inter- age ever took place between them and the smooth-faced invaders does em probable, although undoubted traces of the type exist, especially in the northern provinces. may be also an admixture of the Malay, but ongol type largely predominates in the straight allid complexion, and the more delicate oval es which distinguish the better classes. Small- of stature characterises the whole race. The se are distinguished from other Oriental s by their love of cleanliness, their politeness, ie possession of a certain artistic instinct, and iation of natural beauty.

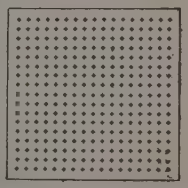

FIG. 277.—*Average population of a square mile of Japan.*

e Japanese language has certain structural affinities with the Altaic but no close resemblance to any known member of the stock. It syllabic and has the verb after its object, features radically separating Chinese, which is a monosyllabic tongue, and which has the verb its object. Other marked peculiarities of Japanese are that the of the verb have no distinction of number or person; the nouns no ns to distinguish gender, number, or case, and that the prepositions he nouns they govern. The pronouns differ to mark the rank or f the person addressed or speaking, an "honorific" system which odifies the verbal forms. A wide divergence exists between the and written languages. Japanese may be written in two ways, a the Chinese ideographs or in the native *kana* (of which there are ms), a phonetic syllabary composed of forty seven simplified cha- the former being chiefly used by the educated, the latter by the lasses.

tory.—Japanese official history dates from 660 B.C., but no records the fifth century of our era are considered trustworthy. Claiming

descent from the gods who created the islands of Japan, the Mikado Emperors held absolute and undisputed sway until the middle of eleventh century, when their authority, passing into the hands of dominant military families, became merely nominal—a state of a which inaugurated a dual system of government, and, only slightly cha in form, lasted down to our own day. The power thus attained by sword had to be maintained by the sword. Continual internecine s waged by the Daimyo, or feudal lords, characterised the Middle Ages. until the appearance in 1603 of the greatest of these military rulers *Shoguns*, as they were called, in the person of Tokugawa Jeyasu, the country enjoy the blessings of peace. By his able administra and judicious distribution of political favours, he succeeded in fi establishing the supremacy of his own house, who continued to the land in profound tranquillity for two hundred and fifty y During this long period a restricted intercourse with Dutch merch at Nagasaki, in the south-west corner of the empire, was Japan's point of contact with the outer world; and it was the attemp the United States in 1853 to break down this policy of isolation w led to the collapse of the Shogunate and the fe system with it, the opening of the countr foreign commerce in 1868, and the restoratio the Mikado to that absolute sovereignty of w he had so long been deprived. The chief subsidiary events of Japanese history include introduction of Buddhism from Korea in A.D. soon followed by the Chinese system of adm tration, the invention of the native syllabar the beginning of the ninth century, the repulse of the Mongol inva under Kublai Khan (1274–1281), the arrival of the Portuguese Spanish missionaries and subsequent persecution of the Christian the sixteenth century, and the closing of the country against the c world in A.D. 1624. The most important events since the signing the treaties with foreign powers in 1859, have been the introductio posts, telegraphs, and railways in 1871–72, the Satsuma Rebellion in 1 under General Saigo—a futile effort to restore the old order of things— proclamation of the Constitution on Western lines in 1889, and successful war with China in 1894–95. New treaties have since been concluded with all the Great Powers, which enable Japan to enter the co of nations on a footing of perfect equality—the first Asiatic State to rec that high privilege.

FIG. 278.—*The Japanese Flag.*

Government.—The authority of the Emperor remains paramo and unquestioned in all matters of government. The Diet, establi under the Constitution of 1889, is composed of two Houses, an Upper a Lower. The members of the former are selected from among the h ditary nobility, and others are chosen by the Emperor for conspicu

n civil or military life ; the members of the latter are elected by the
ges of a limited portion of the people. The Cabinet consists of nine
ers of State appointed by the Emperor, to whom they are alone
sible ; but all laws must receive the sanction of both Houses before
g. The departments over which they preside comprise Foreign
, the Army, the Navy, Home Affairs, Finance, Justice, Education,
lture and Commerce, and Communications. There is also a depart
of the Imperial Household, but its chief has no seat in the Cabinet.
cial assemblies were established in 1889.

ade and Communications.—Japan is no longer a State depend-
ely, as she did for centuries, on her agricultural resources ; but in
actures and industries has already taken a considerable place amongst
tions of the world. The remarkable expansion of her commerce may
n in the figures of the appended tables. Silk is the chief staple of
, the best qualities coming from the provinces of Shinshu, Kotsuke,
oshu. Numerous filatures are now worked by imported machinery.
nks next in importance. It finds its principal markets in Canada and
ited States, where it is used for mixing with other varieties. In the
spinning industry the development has been extraordinarily rapid.
g 1896, raw cotton to the extent of 206,000,000 lbs. was consumed, of
quantity only 1,350,000 lbs. were of Japanese production. Other
ant articles of export include rice, coal, straw-braid, matting, matches,
, and copper. Japan has long enjoyed a high reputation for her
ements in the mechanical arts, notably in metallurgy and the manufac-
porcelain and lacquer-ware. The United Kingdom and dependencies
o the extent of nearly one half in the total foreign trade. Numerous
hip companies provide for an extensive coasting trade. The largest
se also runs vessels regularly to China, India, Europe, and America.
tive junk with its huge square sail still forms a picturesque feature,
n the coast and larger rivers. The first line of railway, 18 miles
gth, connecting Yokohama with the capital, was opened in 1872 ; and
a well-equipped system existed of over 3,700 miles, with many new
n course of construction. The trunk line of railway joins Aomori,
extreme north of the main island, with Kagoshima, in the south of
n. Two branches cross the country from east to west, one from
to Niigata, the other from Kyoto to Kanazawa, while a network of
ines is rapidly spreading over the large plain in which the capital
In districts still unprovided with railway communication, the
ha remains the chief mode of conveyance. An admirable post and
ph system, together with telephone exchanges in all the larger
adds to the convenience of internal communications.

.itical Divisions and Towns.—Before the revolution of 1868
was divided into nine Circuits (*Do*) which were subdivided into
-one provinces (*Kuni*). These ancient divisions still remain in
parlance, but for administrative convenience and political con-

siderations, they have been replaced, without regard to physica historical frontiers, by a classification into three City Governments which comprise Tokyo, Kyoto and Osaka, and forty-three Prefectures (Yezo, under the denomination of *Hokkaido* and Formosa, possess se pa administrations. All the larger towns, with the exception of Kyoto, ma said to derive their prosperity from the comparatively wide and fertile p in which they are situated.

Tokyo, formerly known as *Yedo*, only became the capital when Emperor removed from Kyoto to take up his residence there on th of the Shogunate in 1868. It lies on the Sumida-gawa, one of the r which drain the largest plain in the empire, and, with its subu covers an area of 190 square miles. The government offices, ba public offices, and the various barracks are now the most conspic buildings. Besides much artistic work in lacquer, bronze, and ivory, T now possesses numerous industries for such purely Western commod as blankets, matches, glass and hats. There also many chemical works, ship-building engine works. A suburban line of railway nects the termini of the trunk lines running n and south, these being fed by various bran which traverse the plain. Tokyo has no harb Only vessels of light draught can enter the r

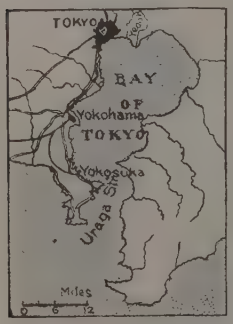

FIG. 279.—*Tokyo or Yedo Bay.*

Kyoto, also called *Saikyo*, was the capital of J from A.D. 794 until 1868. Though the city in modern times, greatly diminished in e and population, its historic associations, toge with its palaces and temples, its art prod in bronze, cloisonné, porcelain, brocade embroidery, and its picturesque native make it the most interesting city in the empire. Kyoto is sup with water from Lake Biwa, about ten miles distant, both by river canal. *Osaka*, lying on the Yodo-gawa, the river which drains Lake B and only twenty-six miles distant from Kyoto, was already a flouris commercial centre at the beginning of the seventeenth century. It was then noted for its castle and the magnificence of the palace built w its walls. At the present day the city covers an area of nearly sixty square miles, and is intersected by numerous canals to facilitate the t port of commerce. Osaka is the chief centre of the cotton-spi industry. A considerable development in ship-building, on Euro lines, has likewise to be noted. The foreign import trade of Osaka is la merged into that of Kobe. *Nagoya*, the capital of the province of O is the largest commercial city on the Tokaido Railway which connects modern with the ancient capital. Its political importance dates from fe days, the founder of the House of Owari having been a son of the Shogun Ieyasu. The plain in which Nagoya stands is one of the

ve to the east of the central range of mountains, and is devoted to tivation of rice. The chief manufactory of porcelain in Japan is a village thirteen miles distant. Several other villages in the ourhood produce porcelain and pottery, largely for the foreign The cloisonné of Nagoya is highly esteemed. *Yokohama*, the "open port" of Japan, stands near the entrance to Tokyo Bay, n miles by rail from the capital, for which it is, practically, the From being a mere fishing hamlet when first opened to foreign ce in 1859, Yokohama has now a population of over 170,000, and ts more than half of the external trade of the empire. *Kobe* ranks importance, both in regard to population and to volume of trade. ation at the eastern end of the Inland Sea and close to Osaka and makes it the principal outlet for the rich products of central Japan. her open ports are Nagasaki in the south-west of the island of , Hakodate in Yezo, and Niigata on the north-west coast of the Main *Nagasaki* owes its prosperity to the coal-fields in its immediate and to the large docks within its magnificent land-locked harbour. ilding has lately been undertaken with considerable success. *Hako-* the emporium for the vast resources of the northern island in ure, fishing, and coal. *Niigata*, being unfavourably situated, has ad any appreciable share in the external trade. Its chief exports e and petroleum. *Hiroshima*, the capital of the province of Aki, on the northern shore of the Inland Sea. It suddenly rose into ence during the war with China in 1894–95, when the Emperor, as nder-in-chief of the army, made it his headquarters. Its produc- bronze, lacquer, and other artistic work claim attention. Other nt towns are *Kanazawa*, in Kaga, and *Sendai*, in Rikuzen, each with ation exceeding 80,000. *Kumamoto* and *Fukuoka*, in Kyushu, and *ma*, in Shikoku, have over 60,000 inhabitants.

anese Possessions.—The **Luchu Islands,** which extend in a esterly direction from Kyushu, were formally claimed by the e in 1879, and incorporated into the prefectural system under the *Okinawa-ken*. Previous to that date the Luchuan king had paid ibute to China as well as to the old feudal lords of Satsuma in but both in race and language the people are closely allied to the e. The largest islands are Oshima and Okinawa (Great Luchu), in r of which is situated *Shuri*, the capital. The port of *Nafa* lies ee miles distant. The area of the islands is estimated at about are miles, with a population of 170,000. Rice and sugar constitute products.

nosa, called by the Japanese *Taiwan*, which, with the small Pesca- oup, was annexed after the war with China in 1894–95, may be said pan's only foreign possession. It has an area of about 14,000 niles, with a population (excluding the savages) estimated at . The area of the Pescadores is only some 47 square miles, with

a population of 50,000. The centre and east of Formosa consist of moun covered with virgin forests of camphor-laurel and other trees, and inha by aborigines of Malay race, some having a tincture of civilisation, other head-hunting savages. The western side is a rich alluvial plain culti by Chinese settlers, who produce large quantities of rice, sugar, tea hemp. Coal, sulphur and other minerals are worked on a small The principal ports are *Kelung* and *Tamsui* in the north; *Anping Takao* in the south-west. The external trade is chiefly in British hand

The **Kuriles** (*Chishima*) form a chain of barren, inhospitable isl several of them containing active volcanoes. The most southerly isl are inhabited by Japanese and Ainu, while the more northerly are ann frequented by seal-hunters. The islands were ceded to Japan by R in 1875 in exchange for the southern portion of Sakhalin.

STATISTICS.

	1886.	1898.[1]
Area of Japan (square miles)	148,742	161,198
Population of Japan	38,151,217	46,453,249
Density of population per square mile	256	288

POPULATION OF LARGE TOWNS (1898).

Tokyo	1,440,000	Kobe (Hyogo)	216,000
Osaka	821,000	Yokohama	194,000
Kyoto	353,000	Hiroshima	122,000
Nagoya	244,000	Nagasaki	107,000

ANNUAL TRADE OF JAPAN (*in yen*).

	1871–75.	1881–85.	1891–95.
Imports	26,000,000	28,400,000	94,000,000
Exports	19,000,000	34,300,000	102,000,000

ANNUAL TRADE OF JAPAN (*in pounds sterling*).[2]

	1871–75.	1881–85.	1891–95.
Imports	5,200,000	4,300,000	9,400,000
Exports	3,800,000	5,200,000	10,200,000

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[1] The figures for 1898 include Formosa and the Pescadores.

[2] Owing to the fall in the value of silver the exchange value of the *yen*, which was 4s. 2d. in 1871, was 2s. in 1895. In the table the value for the period 1871–75 has been taken as 4s., that for 1881–85 at 3s., and that for 1891–95 at 2s.

HAPTER XXX.—THE MALAY ARCHIPELAGO

By Henry O. Forbes, LL.D.

I.—GENERAL CHARACTERISTICS

'osition and Physical Divisions.—The Malay Archipelago pies that immense island-strewn region lying on both sides of the tor, between the 95th meridian east of Greenwich and the western : of New Guinea, an area embracing 40 degrees of longitude, and ıding 30 degrees south of the 20th parallel of north latitude. The ın, though invariably spoken of as a geographical whole (as politically nost entirely is), is far from being homogeneous, so that its usual llation is not altogether appropriate. Its physical and biological acters clearly divide it into two distinct parts. From the Strait of la east to about 118 degrees east there lies a submarine plateau ly 50 fathoms deep, while be- that line all the way to a close to the coast of New ea, extends a deep sea with er basins.

FIG. 280.—*The Malay Archipelago showing Wallace's Line.*

ıe boundary line between this au and the deeper sea, known Vallace's Line (after the dis- shed naturalist who first in- d its existence), lies close to st of Borneo, and may be pro- d through the outer margin of ıilippines and Formosa to the c mainland. The biological features of the region show that, in all .ands to the west of Wallace's Line, the forms of life are the same closely related to, those of the Asiatic continent, while on most of ands to the east they as unmistakably point to Australia as the whence they have spread. This line, therefore, clearly follows what, r recent geological times, was the shore of the continent of Asia. he exception of Celebes the islands to the east, rising out of deeper —the result of longer continued subsidence—have also at various formed part of a greater Australasian continent than the present. m the Asiatic plateau rise the Philippines, and the Greater Sunda s (Java, Sumatra, Borneo). Over the deeper eastern seas are spread

the Celebes; the Moluccas (Halmaheira and the intervening islands to
and the Lesser Sunda Islands, a chain 1,200 miles in length, from Lom
to Timor-laut.

The remarkable specialisation of the fauna and flora in the Philippi
demanding a long period for its accomplishment, indicates that this gr
was earlier separated from the continent than any of the Sondaic Islan
as the deep water in its neighbourhood would also imply. Indeed,
for the Palawan and Sulu banks it would be isolated from the plate
The results of a comparison of the forms of life in Java with those
Sumatra or Borneo are held to warrant the belief that the latter w
connected with the mainland after the separation of the former, wh
must have occurred during the great climatic changes of the Pleistoc
period. Later subsidences severed Sumatra from Borneo, and fina
separated the latter from the Malay Peninsula. Of the islands east
Wallace's Line, Celebes is surrounded by very deep seas, and in p
senting a fauna (whose affinities are Asiatic), with a degree of specia
sation exceeding any in the Archipelago, it proclaims the still grea
antiquity of its separation from that continent, and its entire isolati
ever since, by the absence of forms that ought otherwise to have be
present. Of the island-groups with characteristically Australian affi
ties the Lesser Sunda Islands were probably detached from the Australi
mainland before the Moluccas, which appear to have been separated sub
quently to the submersion of the Asiatic plateau.

The most notable physical feature of the Archipelago is its vulcanici
A chain of cones, some extinct, some dormant, and others active, swee
in a semicircle round its border from Sumatra eastward to the Phili
pines. The geological structure of many of the islands is still unknow
In Sumatra, Borneo, the Philippines, Celebes, and Timor, ancient roc
occur; but most of the others are composed mainly of Tertiary stra
over which the ejecta of the volcanoes are piled to an enormo
depth, and form the bulk of the high land in the Archipela
(see Fig. 19).

Climate.—The climate is tropical and humid, and with the excepti
of the Philippines, part of which lie within the region of typhoons, t
Malay Archipelago is not subject to violent extremes. Along the equ
torial belt, about four degrees wide, the wet and dry seasons, wh
occur with great regularity beyond those latitudes on both sides,
ill-defined. In this region rain falls more or less throughout the ye
South of the equator the wet season lasts from November till Marc
the period which north of the line is the dry season (see Fig. 323).

Flora and Fauna.—On the west side of Wallace's Line, vegetati
carpets the ground from the water's edge to an altitude of 7,000 feet, wit
palms, bamboos, Euphorbias, Papilionaceæ, and Artocarpeæ; with gian
Altingias, laurels, oaks, and Dipterocarpeæ. Monkeys, tigers, rhinocero
tapirs, elephants, and ruminants roam the islands; woodpeckers, trogon

ets and pheasants people the forests. On the east side, Eucalyptus, arinas, phyllode-bearing Acacias, Podocarpeæ, and Cycads, unknown e west, mark the Australian character of the flora. The terrestrial mals just named are absent. The Cuscus and other marsupials take place. Cockatoos, megapodes, cassowaries, and Birds of Paradise the eye, while woodpeckers, barbets, and pheasants are conspicuously nt.

Native Peoples.—Viewed generally the archipelago is peopled by ys, who are mostly Mohammedans, and Melanesians, who are nearly agans. Although predominant to the west of Wallace's Line, the Malay pread to the nearer Sunda Islands, and many of the Moluccas. The nesians occupy the more eastern islands. The Malay is typically a olive-brown Mongolian, with a round head, straight hair, bare face, cheeks, and slightly oblique eyes. In temperament he is sedate, se, ceremonious, yet revengeful and cruel. The Melanesian is a -brown Ethiopian, tall, with a long head, covered with a mop of y hair, a narrow face, often well bearded, and with a prominent nose; mperament he is lively and boisterous. The origin of these races is a plex problem. The Malays, as known to us in purer Atjinese and anese—a race developed through the commingling of Caucasian and minating Mongol blood in Indo-China—were the last incursionists the region. They followed an earlier pure-Caucasian migration—n as Polynesians, whose last remnants in the Archipelago linger ne Mentavi islands on the west coast of Sumatra—who drove Negrito autochthones of the Archipelago out into the remote in- of the Philippines and other islands, and were themselves over- ned by half-breeds of Mongol and predominating Caucasian blood, known as Indonesians, of whom the Battaks and Dyaks are rors.

like manner the Melanesians of the Solomon and New Hebrides ls, migrating westward into the eastern part of the Archipelago, partly nted, partly commingled with the Negrito autochthones; and then sioid (Polynesian) pre-incursionists, whose strain appears still in of the people, as well in their language as in their customs. ghout the Archipelago low Malay is the *lingua franca* on the coasts; ch island has its own dialect, or language, and sometimes many ges are spoken in one island.

Political Divisions.—Politically the Archipelago was long divided en the two European Powers, Spain and Holland. The Philippines passed from the possession of Spain to that of the United States; xcept for the eastern moiety of Timor, which is Portuguese, and siderable area of the north-west of Borneo, which is a British torate, the remainder of the Malay Archipelago forms the magnifi- ossession of Netherlands-India.

II.—THE PHILIPPINE ISLANDS

Extent, History, People and Trade.—The Philippine Islan numbering some 1,200, separated by narrow channels, covering an a not quite so large as the British Islands, with a population of millions, lie between 21° and 4° N. from 116° to 128° E. Most of islands are extremely irregular, h and intensely volcanic. The loft mountain in the group attains 10, feet of elevation. The rainfall is hea the vegetation luxuriant, and there innumerable lakes and rivers. mean temperature is about 84° F., the annual range under 40°. Tho fever and many zymotic diseases, ventable by better sanitary supervis prevail, the Philippines are fa healthy. The inhabitants are Mal much crossed with Chinese blo Negritoes, and a few Indonesians.

FIG. 281.—*Philippine Islands. The map includes 700 miles by 500.*

Discovered in 1521 by a Span squadron, under Magellan—who his life on the occasion, fighting with the people of Zebu—the Phi pines were called St. Lazarus Islands, which twenty years afterwa was changed to their present name, in honour of Philip II. Only 1565, however, forty years after their discovery, first Zebu, then Pan and finally Luzon, were taken effective possession of by a force un Miguel de Legaspi. After that date Spain held the whole group, thou several of the southern islands hardly acknowledged her authority. the capture of Manila in 1898 the United States of America undert the control of the islands and the Spanish forces were withdrawn.

The chief products of the group are tobacco leaf, cigars, hemp and sugar, which make up nine-tenths of the value of the exports; and also coffee, indigo, copra, rice, and pine-apple fibre. The Philippines, under the Spaniards, were administered by a Captain-General, under whom were the four Governors of Luzon, Bisaya, Mindanao, and the Adjacent Isles. Every religion was forbidden except the Roman Catholic, whose priests consequently became very influential.

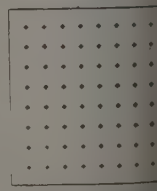

FIG. 282.—*Average lation of a square of the Philippines.*

Since occupied by the United States the group has been organised i 39 provinces, each under a Governor, while municipalities have b formed and schools established. There is also a Governor for the wh group, assisted by a legislative body of seven.

rincipal Islands and Towns.—Luzon Island is the largest and fertile of the group. Sugar and tobacco are largely cultivated. e are a few miles of railway and telegraph lines, and it is proposed tend the railway system by the construction of a trunk line 600 miles ; a transverse line from Manila to the east coast ; and various branch *Manila*, the capital of the Philippines, was captured and founded 71. It is protected by *Cavité*, nearer the sea, on the Bay of Manila, tified harbour with an arsenal and dockyard, which was taken by ral Dewey for the United States in June, 1898. The Manila Obser- y, founded by the Jesuit, P. Federico Faura, in 1865, has a world-wide rity. The volcano, Mount Mayon, 9,000 feet in height, is noted for sastrous eruptions. *Iloilo*, in the Island of Panay, with an excellent our, is the second city in the Philippines in commercial importance. gely exports sugar, tobacco, Manila-hemp, and perfume. Coal beds ound in Samar and in Zebu, whose chief town of the same name is ldest settlement of the colony. On the island of Mactan, in its our, Magellan, the navigator, was before he had completed the first mnavigation of the globe.

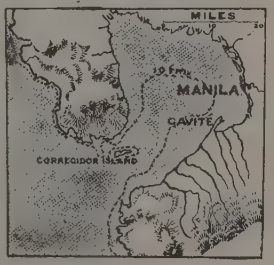

FIG. 283.—*Manila Bay.*

indanao island, the next in size to n, is very fertile. It contains gold, silver, and coal in considerable dance, and there are valuable forests ony and teak. *Zamboango* is its chief The Sulu islands, which form part e government of the Philippines, are by a tributary but very powerful . Palawan and Balabac islands are aphically and biologically part of o. *Puerto Princessa* is the chief town and port. Burial caves of ntiquity, containing bones, vases, and ornaments of Chino-Japanese ., indicate an early Mongolian occupation, of which all tradition

III.—BRITISH BORNEO

itish North Borneo.—Although most of the Malay Archipelago o the possession of the United Kingdom in 1811, it was returned former rulers in 1817, and now only a part of Borneo, about ea of Great Britain, is under British protection. British North occupies the northernmost part of the island. Ceded to a ny under grants from the Sultans of Brunei and Sulu, which confirmed to it by Royal Charter in 1881, it was in 1888 pro- d a British Protectorate, to which Labuan Island was annexed in lowing year. Tobacco, coffee and pepper are largely cultivated.

These, with forest products of the same kind as those described un
Dutch Borneo, form its export trade. The revenue is derived from
opium and spirit rents, import duties, licenses, and royalties. *Sandak*
on the north-east coast, is its chief town, and a telegraph cable conn
the Protectorate with Singapore.

Brunei is a small native State lying between British North Borneo
Sarawak, and is ruled by a Sultan, who came under British Protection
1888. The name of this State has come, in a slightly modified form, to
applied to the whole great island.

Sarawak, considerably larger than British North Borneo and Bru
combined, has a coast line of 400 miles on the north-west side of
island. It was in 1842 made over to an Englishman, Sir James Brooke,
the then Sultan of Brunei, and administered for nearly fifty years by t
gentleman and his successor. In 1890 it was proclaimed under Brit
Protection. Sir Charles Brooke is the present Raj
His capital is *Kuching*, on the Sarawak river, a li
over 20 miles from its mouth. The exports are
same, and the revenue is raised on the same subjects
in British North Borneo. Gold, and other preci
metals, diamonds, and coal beds, are amongst
natural products of the territory.

FIG. 284.—*The badge of British North Boreno.*

The natural features of British Borneo, which,
a whole, includes practically the entire north-west
drainage area of the island (see Fig. 287), are described along with th
of the Dutch possessions.

IV.—THE DUTCH EAST INDIES

Government and Administration.—With the exception of t
Philippine Islands, British Borneo, and half of the island of Timor t
whole Archipelago is a Dutch possession, Netherlands-India (*Nederland*
Oost Indie) or the Dutch East Indies. The area of these colonies is six
two times as great as that of the mother country; they are all ruled b
Governor-General appointed by the States-General in Amsterdam, assis
by a Council (*Raad van Indie*). Under the central authority the wh
of the islands is divided into Governments and Residencies accordi
to the importance of the provinces. Each governor or resident h
under him assistant residents, subordinate to whom are controllers, o
for each district. These officers exercise almost unlimited administrati
and judicial powers. In the tributary States the resident *advises* t
native potentate to whom he is accredited, who carries out these instru
tions by his own subordinates. In the provinces which are direct
governed, the controllers assume the same attitude to the native chief
who are held responsible for the due execution of the governme

sts. The army, composed partly of natives and partly of European
enaries, under Dutch officers, numbers about 40,000 men. The
consists of about 80 vessels, of which the majority are colonial and
emainder of the Dutch Royal Navy.

ince 1830 the Dutch have farmed all the more valuable cultures in
and also in West Sumatra and the Minahassa, in Celebes, as
opolies, which the natives have been forced—as the tax they were
able to pay—to plant and crop gratuitously, and to deliver the
uce at the government stores at a fixed price. The result was a large
y revenue to the government, and to the native, remuneration
dantly sufficient for all his needs. The general prosperity of the
le under this *régime* is evidenced by the continued (and in some
es extraordinary) increase in the population of the islands. The
opolies, except coffee, have now been abandoned, and forced labour,
pt for one day a week on the roads, has been commuted for a small
y money tax.

nder the Dutch there live in the Archipelago about 35,000,000 people,
hom only 63,000 are Europeans and half a million Chinese. In the
ts of Justice, Europeans are tried according to the laws in force in
and, and the natives by the same modified according to Malayan
oms and institutions.

The revenue of the Possession is mainly derived from the Government
opolies—the railways, the farming of salt and opium—and the sale of
e grown under forced labour, with duties (import and export), and
. Coffee and sugar are by far the most important exports ; tobacco,
nd indigo following. There is a small inter-insular trade done in
s, for which the native blacksmiths are famed, and in articles of dress,
ularly sarongs, peculiarly dyed (or *batek-ed*) in Java.

GREATER SUNDA ISLANDS

Java.—Java, although not the largest of the Greater Sunda Islands, is
nost important of the Dutch possessions. It is the most fertile,
ost highly cultivated, and the densely populated island in
rchipelago. It lies entirely en 6° and 8° S., and is 590 in length, from west to east. outh coast is bold and rocky, rthern low and fringed with ove swamps. The whole of the island is mountainous, with only a few elevated plateaus, ghest summit reaching 12,000 feet, and there are a score over 9,000 No equal area of the globe contains so many volcanoes ; the whole is practically covered with the mud—they rarely discharge lava—

FIG. 285.—*The Volcanoes of Java*

which they have thrown out. The few sedimentary rocks which occ
are entirely of Tertiary age. The rivers are numerous and fai
large, but none are navigable, and there are practically no lakes. Luxu
antly clothed with vegetation, Java is a paradise to the botanist. Mo
(*Semnopitheci*), apes (*Hylobates*), tigers, leopards, rhinoceros and w
cattle (*Bos banteng*) are its more conspicuous mammals. Over 200 spec
of birds, including pea-fowl, are found in its jungles and mountai
A fossil (*Pithecanthropus erectus*), remarkable for its combined hum
and simian characters, has been discovered in Tertiary strata in t
Bengawan valley.

People and History of Java.—The west of Java is peopled by t
Sundanese, the east by Javanese, and the island of Madura at its east
extremity, which is always included with Java, by a distinct race, t
Madurese. All of them are Malays, but in the Javanese there is a strain
Hindu blood. In addition there is a large population of Chinese, Arabs a
other nationalities. In some districts the density of the population is
high as 900 to the square mile. The three chief languages differ from ea
other widely. Javanese, however, is the most cla
rate and highly developed. It possesses both a co
and a vulgar dialect, and has a script, peculiar to its
which had its origin in India. All three peoples
Mohammedans, tinctured in the west with Paganis
and in the east with Brahmanism. They are
very skilled agriculturists, and employ a most cla
rate system of irrigation.

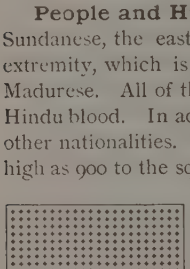

FIG. 286.—*Average population of a square mile of Java.*

The first immigration into Java, so far as know
by races subsequent to the Malay occupation, w
by Hindus, probably about 800 years before th
power was broken by Arab Mohammedans in 1478. They introduc
their religion and a high civilisation into eastern Java and the island of B
which is attested by the ruins in those regions of great cities, and vast a
finely sculptured temples. Between 1511 and 1550 the Portuguese reach
the island and did some trading with the people of Bantam, where the fi
Dutch post was established in 1595. In 1602 the Dutch East India Co
pany was formed, and in 1609 a fort was erected at Batavia, but it was n
till sixty years later that the first territorial acquisitions were made, wh
have extended into the splendid possessions of to-day. In 1685 the Engli
who had also been attracted to Bantam, but had been forced to give wa
to the Dutch, moved to Benkoolen, in Sumatra, leaving Java free to th
rivals. In 1798 "The Company," as the ruling power still continues to
called by the natives, was dissolved, and the mother country assumed t
direct government of Netherlands-India.

Divisions and Towns of Java.—For administrative purpose
Java with Madura is divided into 22 residencies. *Batavia*, the capital, is
large town situated on a low plain, at the mouth of the Tji-liwong. It co

of the original Batavia, and the new town, a couple of miles to the h. The former contains the native quarter, the Stadt-house, and the ness offices and godowns; the latter the hotels, the European residences, official palace of the Governor-General, and the government offices, ounding a large park—the King's Plain. Canals everywhere traverse n towns, lined by trees which shade the streets that run beside them. rly every dwelling—native and European—is embowered in vegetation. w miles east of the Tji-liwong mouth, a fine harbour has been built at *djong Priok*, whose stone piers are capable of accommodating the est vessels. It is connected with Batavia by canal, road and railway. the hills, 35 miles south, is the town of *Buitenzorg*, at an elevation of 750 , a delightful sanatorium, surrounded by high mountains and amid most utiful scenery. It is the usual residence of the Governor-General, whose ce stands in the richest and most beautiful botanical garden in the ld. *Bantam*, on the north-west coast, one of the most important cities e East in the sixteenth century, was the site occupied by the Portuguese, ch and English, on their first reaching Java. *Samarang*, a seaport ated about the middle of the north coast, is commercially important, its open roadstead is often a rough and unsafe anchorage in the west soon. It is connected by railway with the main line through the lle of the island. Some 30 miles south is *Soerakarta*, the most populous n in Java. It is the capital of the independent territory of the Susu- n, or emperor, who resides there; but while retaining his court and , he is guided and "advised" by a Resident. Still further south, *Djokdjo- n*, also the capital of a dependent sultanate, was long the rival of akarta. Both are now stations on the Central Railway.

Ruins of the temples of the Hindu period are widely spread over the e of this region; those of *Boeroboedur* are celebrated for their extent magnificence. *Tjilatjap*, a free port, and the only good harbour on the coast, is connected with Samarang and Soerabaya by railway. *Soera-* at the mouth of the Solo river, at the eastern extremity of the island, is of the largest towns in Java, and the most important commercially. It rown up on a natural harbour that cannot be excelled. A short dis- from the town are the ruins of *Madjopait*, the ancient Hindu capital, n the Arabs destroyed in 1478.

Neighbouring Islands.—Large clusters of small islands are scattered the northern coast of Java. The traveller entering the Strait of Sunda e to face with his first evidences of the volcanic nature of the region series of symmetrical cones, of which **Krakatao,** shattered by the rable outburst of 1884, is the most remarkable. On emerging from the into the Java Sea, he has to thread his way amid clumps of verdure, the alabaster basins of their coral beaches, known as **The Thousand nds,** as far as the Roads of Batavia, which for centuries was the great rage of the East, till the harbour of Tandjong Priok was built. on Java, Bawean and Kangeang are the remaining more important

clusters. Two or three small islands off the south coast are so close to th mainland that they may be reckoned as part of Java itself.

Bali.—This island lies near the eastern edge of the submerged Asiati plateau, separated by a shallow and narrow strait from Java. It is usual t reckon Bali as the most westerly of the Lesser Sunda Islands; but, cor nected as it is with the Asiatic plateau, it is geographically, as it certainly biologically, a part of Java, and ought never to be disassociated from th Greater Sunda Islands. It is very mountainous and volcanic; the highe peak, Gunong Agong, rising to 10,000 feet, is a dormant volcano. Th streams are numerous but small, and there are few lakes. The Balines are Malays with a strain of Hindu blood, who still retain the Brahmanic religion, which elsewhere in the Archipelago is lost. They possess a extensive literature in a language of their own, written in slightly modifie Javanese characters. In the working of iron and gold their artificers hav a high reputation. As agriculturists they are very successful owing t their skill in the irrigation of the soil. Bali produces coffee, rice, an tobacco; these, with copra and cattle, are the chief exports. Various sma rajahs divide the ownership of the island among them. *Buleleng*, the chi town and port, is the seat of the Residency, which includes Lombok.

Sumatra.—The second island of the Archipelago in size is Sumatr which forms the western boundary. It extends in a north-west and south east direction for six degrees on each side of the equator; it is over 1,00 miles in length, and in greatest breadth about 300. Including the su rounding islands, it is more than three times larger than Java, although i population is only one-seventh of that of the more favoured island. It separated from the Malay Peninsula by the Strait of Malacca, and fro Java by the Sunda Strait. The main physical feature of Sumatra is high narrow mountain chain—the Barisan—buttressed by plateaux in som parts and studded with dead, dormant and active volcanoes along its we coast, and a wide alluvial plain on the east side, from north to soutl formed by the deposits resulting from the long denudation of the Barisa In the mountains, Palæozoic slates, schists, and limestones have bee found; but Secondary rocks appear to be entirely unrepresented in th island, which is chiefly composed of Tertiary strata, containing extensiv deposits of coal. The rivers on the west side are numerous, but shor rapid, and unimportant; those flowing to the east are also numerous, b large, placid, and navigable, many of them for several hundred mile across the alluvial plains. The more important from north to south a the Rakan, the Kampar, the Indrigiri, the Batang-hari, and the Palembang of which the last two carry to the sea the waters of four degrees of la tude. There are numerous lakes—Toba, high up among the mountains i the north, Korintji, and Ranau being the largest. Since Sumatra is cross by the equator the seasons in the north are the opposite of those in t south. Along the equatorial belt there are no definite monsoons, and ra squalls occur throughout the year. The plains, from their humidity an

n temperature, are very unhealthy ; but on the mountains, at elevations r 3,000 feet, no better climate can be desired.

The flora of Sumatra is exceedingly rich ; the whole surface of the island rest clad. Gutta-percha trees—from whose abundance Sumatra derived name of *Pulo Pertja*—are among the most valuable denizens of its sts. Camphor trees, Dipterocarpeæ, many of the species attaining to a t altitude, and *Pinus Merkusii* are also notable. Among its mammals tapir, the mountain goat (*Antilocapra sumatrana*), the elephant, and the ng-utan are characteristic, while among its birds the Argus pheasant and Bronze-tailed peacock-pheasant may be specially named.

People and History of Sumatra.—The people are pure-blooded ays, but among them are interspersed colonies of Melanesians (*e.g.*, the aks), a Malayo-Caucasian race. High Malay, or dialects of it, is the uage spoken throughout Sumatra. In the Lampong, Palembang, and ak regions it is written in a character whose origin has been traced to Indian mainland and to Phœnicia. In the eastern plains the people mostly Mohammedans ; in the mountains they are mainly Pagans.

At an early but unknown date Sumatra received a large incursion of dus, whose traces are left over a wide area in numerous stone sculp- s, which, however, are far ruder in execution than those in Java. The European to visit the island appears to have been Marco Polo who ined for some months in 1291. Varthema, the Italian, is doubtfully ited with touching at Atjeh in 1505. In 1598 the Dutch formed their settlement there. During the reigns of Queen Elizabeth and of James I. lish ambassadors were sent to reside at the Court of the Sultan of a (Achin), who appears to have been then a great potentate. In 1685 British traders, on being ousted from Bantam by the Dutch, established iselves at Fort Marlborough, in Benkoolen, which they occupied till , when it was exchanged for Malacca. Since that date the whole of atra—except Atjeh, with which there has been a chronic state of war it is said successfully concluded—has been effectively occupied by the h.

he trade and industries of Sumatra are similar to those of Java, but tobacco is cultivated. Black pepper, largely grown in the Lampongs, s an important article of export. The forest products are extremely ble. These are principally gutta-percha, camphor, dammar, beeswax, ambier. Gold occurs abundantly in Jambi and northern Palembang. e Padang highlands there are valuable beds of coal. The native factures are few, krises, sarongs, gold and silver filigree work being nief, but made only for sale or barter among the natives themselves. a few miles of railway have yet been laid down ; all the chief towns owever, connected by telegraph with Batavia.

visions and Towns of Sumatra.—Including the Riow Archi- o, and Banka on its east coast, Sumatra is divided, for administrative ses, into nine Residencies.

Telok-betong, the chief town of the Lampongs, situated at the head a long gulf of the same name, is the principal port for the shipment black pepper. It suffered severely by the sea-wave following the fin outburst of Krakatao in 1884. *Padang*, a large and important seapo about the middle of the west coast, is the seat of the Residency, and has large export trade from the Padang highlands, and the island groups the westward. The Peak of Korintji, in the south of the Residency, th highest mountain in Sumatra, attains 12,000 feet in height. The larg lake of the same name on the east of the Barisan, drains into the Jam river. *Olelch*, on the north coast, is the port for *Kota-raja*, the capital Atjeh. From *Deli*, on the east coast, tobacco, grown on the numerous larg plantations, which extend inland, forms the chief export. The leave which are used to form the outside wrappings of the best cigars, fetch high price in the European market. Hence is reached the country roun Lake Toba, which has an area of 500 square miles, and is inhabited by th Battaks, an Indonesian pagan race, who practice cannibalism on the enemies, but who nevertheless possess an alphabet, invented by an peculiar to themselves. *Jambi*, the capital of the Sultan of that territor is situated on the Batang-hari river, which is navigable by steamers fo nearly 500 miles. In the south-east *Palembang*, on the river of the same nam is separated from the sea by 40 miles of half-submerged alluvium. It is th capital of the Residency, and has a mixed population of Malays, Chines and Arabs, making it the largest and busiest mart of the island, and th "receiving house" for the produce of a vast and rich area, brought by ra and boat from the base of the Barisan. The city, a great part of which built on floating platforms, is quaint and picturesque, and altogether one the most interesting towns of the Archipelago. Mount Dempo, one of th peaks of the Barisan, is its highest mountain. In the south-east corner of th Residency is *Ranau*, a district surrounding a lake of the same name, note for the excellence of its tobacco.

Islands of Sumatra.—Of the satellite islands lying off the ea coast—the Riow Group, Banka and Bileton—the two last are the mo important in containing the famous tin mines (discovered in 1709), whic yield annually an average of nearly 10,000 tons of ingots. Off the we coast, and some 70 or 80 miles off, lie the Nias, the Nassau, and th Mentawi Islands, the last named forming the largest and most importa group. Its islanders are noteworthy as being the only remnants n inhabiting the Archipelago of the Caucasioid stock from south-easte Asia, who ousted the Negrito autochthones, and for a time occup probably all the islands east to the Pacific, where they are now fou

Borneo.—The largest island of the Archipelago, and the third on globe not ranking as a continent, lies across the equator between 7° and 4° S. The Balabac Strait and the Sulu Sea separate it from Philippines, and the Macassar Strait from Celebes. The island is irregularly triangular, and its northern and southern coasts are more irregular than

se on the east and west. Its geological structure proves it to be a gment of a continental land. The central mass of Tabang, with its iating range of mountains, contains strata of all ages from Primary to aternary. Between its mountain arms, low level alluvial valleys extend back into the country, which would by a small amount of subsidence he south and east be overflowed by the sea to the centre of the island. v of the mountains, except Kinabalu in the north, are high, and none volcanic. There are no lakes of any magnitude; but of its rivers, ch are numerous and tortuous, a few are large. The Barito, flowing due th, the Kapuas, running west almost on the equator, the Bulangan, ving due east, the Redjang, flowing due west to a great delta on the awak coast are the chief. Most of them can be navigated by boats far the interior.

The meteorological conditions and climate of Borneo are very similar those prevailing in Sumatra—an equatorial belt of variable weather des the northern from the southern ions, which are regular, but opposite eason. The fauna and flora also agree y closely indeed with those of Sumatra, the tiger and the tapir are absent. neo has, however, a peculiar anthro- d—the Nosed Monkey (*Nasalis larvatus*) nd is rich in birds, over 500 species biting its forests and mountains.

FIG. 287.—*Borneo.*

People, History and Trade of neo.—The inhabitants—Dyaks and ans, by name—now much mixed with ese blood, are largely Indonesian ns who occupy the interior of the d. The coasts are tenanted by ese, Arabs, and chiefly Malays from western Malaysia, of whom ribes known as Bajans still live by piracy. Some of the southern cts seem at one time to have been occupied by Hindus. In north-west of Borneo, the Sulus predominate. The Dyaks are less sed than the Sumatrans; they have no literature, and no script. They n large communal pile dwellings, and are spoken of as likeable es by those who have lived among them. Their head-hunting—the amongst them of manhood—is practised, not from bloodthirstiness, ich as from conformity to inexorable custom which demands it as an tial to matrimonial success. They have no manufactures beyond the ation of a few krises, ornaments of gold, or silk sarongs—all of high —for their own use or barter. Rice, sugar, and a little tobacco are products the people cultivate, and those mainly for their own use.

e export trade of Dutch Borneo consists of Chinese or European ated tobacco, sugar and pepper, and the native-collected forest produce

of edible birds' nests, bees-wax, dammar, and gutta-percha, with son bêche-de-mer and tortoise-shell. The natural resources of the island ar however, still almost entirely undeveloped. Vast fields of coal of Tertia age, composed mainly of large dicotyledonous trees, occur in the sout near Martapura; and though there are abundant deposits of the mo valuable minerals and metals, gold and diamonds are alone extensive worked.

Ludovic Varthema was the first European to visit Borneo, early in th sixteenth century; the Spanish squadron which put into Brunei on i way from the Philippines in 1521 next reached the island. Then some te years later the Portuguese, who had touched in 1526 on their way to th Moluccas, established a few ports from which they carried on trade f over 150 years. It was not till the close of the sixteenth century, howeve that the Dutch reached Borneo, where they also settled and traded f 70 years. Close on their heels came the rivals of both, the English, wh fixed their stations at Bandjermassin, where they remained till the beginni of the eighteenth century, when, owing to the hostility of the natives, th left the island. Onwards from 1733, when the Dutch returned, ar especially since 1825, Holland has slowly increased her territory, till no the whole of Borneo, except the region on the north-west coast und British protection (p. 559), is under her dominion.

Towns of Borneo.—Dutch Borneo is administered under tw Residencies—those of South and East Borneo combined, and of We Borneo. The former province has an area thirteen times as large Holland, though its population is less than a million. Its chief tow is *Bandjermassin*, on the Riam-kina, a tributary of the Barito; most the inhabitants live in floating raft-houses, and pile dwellings. It is large port, keeping up frequent communication with Batavia, the re of the Archipelago, and Singapore. *Pasir* and *Tangarong*, on the nort east coast, are the chief towns of small semi-independent sultanate inhabited chiefly by Kayans. The Western Residency is about one-thi the size of the Eastern. Its chief town is the large port of *Pontiana* on the delta of the Kapuas river, fifteen miles from the sea, and situat on the equator. It does a large export trade, of which gutta-percha the most valuable commodity.

CELEBES

Celebes, which lies east of Borneo, west of the Moluccas, and sout of the Philippines, between 2° N. and 6° S., is remarkable for its singula configuration. Four long, mountainous peninsulas radiate from a hig central mass, and there are no alluvial lowlands of any extent. Orograph cally, it seems to be composed of parallel ranges, separated by valleys, part occupied by lakes. Near the centre a high peak, Mount Koruvi, thought to be over 10,000 feet high. The rivers are mostly short an unnavigable, but the Koro, in the west, is a large stream. The oldes

ta are sandstones, crystalline schists, and limestones of pre-Cretaceous , possibly in part Palæozoic, as biological evidence indicates for the nd a great antiquity and early continental character. A deep sea pro- ly existed in Cretaceous times, while a movement of elevation began at close of the Eocene.

Its northern part has an equatorial climate, and the southern the definite and wet seasons of its latitude. Celebes is considered to be one he healthiest islands in the Archipelago.

The people are Malays, partly pagan, partly Mohammedan, except in Minahassa district in the northern peninsula, where they are Chris- ised. The southern Mohammedan races, of whom the Bugis are the t known on account of their wide trading voyages over all the Archi- ago, use a script resembling but not identical with that used in Sumatra. The Makassar and Minahassa districts are alone effectively occupied by Dutch; the rest of the island being ruled by rajahs, who can hardly be l to acknowledge the sovereignty of Holland. The first Dutch establish- nt in the island was effected at Makassar in 1618. In the middle of the enteenth century they ousted the Portuguese, and have since then ained the nominal masters, except for short period when (during the Penin- r War) the Dutch possessions were l by the United Kingdom. *Makassar*, he southern peninsula, is the greatest ve mart in the Archipelago; through asses the whole of the trade of the nds to the east up to and including Guinea—bêche-de-mer, tortoise shell, l shell, Birds of Paradise skins, and es. From *Dongala* on the west coast, seat of an independent rajah, excellent és are exported. *Menado* is the town of the Minahassa, one of the st and best cultivated provinces in Dutch possessions, long famed for the excellence of its coffee. The le, who are Christians, cultivate these government coffee gardens r the forced-labour system; but, exercised as it is under a kindly nal government, the people are prosperous, happy, and contented, ndeed, they are almost nowhere else in the Archipelago. The hassa plateau, rising to 2,000 feet above the sea, is one of the most iful and fertile in the world. *Kema*, on the opposite side of the sula, twenty-three miles from Menado, is the port of the province g the west monsoon, during which a dangerous surf prevails at do.

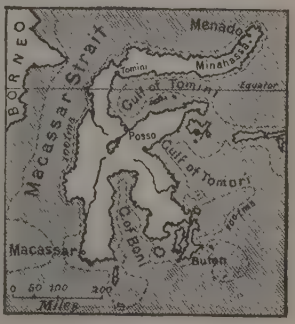

FIG. 288.—*Celebes.*

merous island groups surround Celebes, the chief are the Sanghir ls in the north; Butung, Tukang Bessi and Salaier, off its southern sulas.

THE MOLUCCAS

Moluccas.—Under the general name of the Moluccas or Spic Islands are included three groups of small islands clustered respective round one or more larger islands, the principal being Halmaheira, Bur Ceram (or Serang) and Ke. The Moluccas are traversed by the gre volcanic chain of the Archipelago. Many of its islands are volcanic cone some are raised coral reefs and others are composed of crystalline roc of Palæozoic age. The majority are as yet but little explored. Th vegetation is luxuriant and of Papuo-Australian affinities. The nutme clove, and cardamom trees are the species which first made the regio famous as the Spice Islands. In its fauna marsupials take the place mammals. Kangaroos, cassowaries, and Birds of Paradise appear for th first time in our journey east. Butterflies are, like the birds, remarkabl for their abundance and beauty. The climate of the Moluccas presen the variety and the differences, already noted, of a region extending o both sides of the equator. Here, however, the seasons are somewha modified by the proximity of the islands to New Guinea.

Three races commingle in the Moluccas. A few remnants of th Mongolo-Caucasian forerunners of the Malays still linger, Malays and larger proportion of frizzly-haired Melanesians of Papuan stock, wit hordes of mixed Chinese, Arab and European blood. Most of the island have a language of their own, but without a script. The discovery of th Spice Islands is lost in antiquity; their fame however long antedate their geographical localisation by the Western world. This was at las accomplished by the Portuguese officers D'Abreu and Serrano in 151 The islands were annexed to Portugal in 1522, but in 1583 the native expelled their masters. In 1613 the Dutch came on the scene and, partl by treaty, partly by force, acquired the whole of the possessions of th Sultans of Ternate and Tidore, which embraced Mindanao, the Molucca and the whole of north-western New Guinea, all of which, excep Mindanao, still belong to the Netherlands.

Halmaheira (or Gilolo) and its surrounding islets form a very mountainous and volcanic group. They are inhabited by Melanesians, Papuan stock somewhat mixed with Malayan blood, and it is curious th they are Mohammedan in religion, though the Melanesian strain is in th ascendancy. *Ternate*, consisting of the peak of that name, 6,000 feet i height, is famed throughout the Archipelago for its beautiful harbour The Sultan has his residence there. *Tidore* is a minute islet, but the seat of the great rival sultanate to Ternate, through which it became a name famous in the Archipelago. *Batjian*, a considerable island, but sparsely populated, is zoologically interesting from containing a genus of Birds of Paradise peculiar to itself.

Buru, a large island to the west of Ceram, is in its western half high and mountainous, and has on its eastern side a wide alluvial plain. In the

e of the island, at an elevation of 2,000 feet above the sea, is the lake ikolo. The inhabitants are Malayo-Papuan, and their chief industry manufacture of kajuput oil from the leaves of *Melaleuca kajuputi*. is the only town of consequence.

outhern Moluccas.—The largest island of the southern Moluccas am, which as yet is very little explored. The people on the coast are s, and in the interior more or less pure Melanesians. Sago is the sole t. Amboyna (with Saparna, Haruku, and Nusa-laut), though small in is the most celebrated and one of the most interesting of the Spice ds. To Amboyna it was that the lucrative and coveted clove-monopoly estricted by the Dutch, and secured by exterminating the tree in every island. The monopoly has now been abandoned in favour of a tax on the adult male population. This island group is mountainous, nic, and richly clad with vegetation. Amboyna itself is one of the niest islands in the Archipelago. The people are Mohammedan Malays, nesians (Ceramese) and Christian descendants of Europeans by native ers. *Amboyna*, the chief town and capital of the Residency, is a large ry station. Banda, 140 miles south-east of Amboyna, is a small cluster canic islands rising from the depths of the Banda Sea. On Banda-neira the town and fort, facing west to the smouldering island-cone of ng Api. On Lontar, the largest of the group, are laid out the principal g gardens, for which the islands are famous, and from which the 's supply is almost entirely drawn. The value of the spice is ted at about $450,000 annually.

ne Ke Islands, consisting of between thirty and forty narrow ainous islets, separated by small channels, extend for sixty miles of the 6th parallel of south latitude. Numerous rajahs divide en them the ownership of the group, whose inhabitants are, with the ion of a few Malays, mainly Melanesians of Papuan origin. Their s boat-builders and as artistic wood-carvers has spread throughout chipelago.

THE LESSER SUNDA ISLANDS

e Lesser Sunda Islands form the long chain stretching from k eastward to Timor-laut. Many of the links of this chain rise from te submarine bank and thus combine into island-clusters, which must mer time have been more closely connected together than they are. Of these the islands from Lombok to Ombay comprise one cluster; and Timor, with Wetta and the Serwatty islands are independent ach rising out of deep water, while the Timor-laut bank gives origin ner closely inter-related constellation. As a whole the group is arid, s verdure-clad than the islands farther west, and both biologically as in appearance it is Australian. This greater dryness of these especially those further to the east, is due to their proximity to the interior of the continent to their south and east. With few excep-

tions they are mountainous and very volcanic; many of them, how
are still but slightly known.

Lombok-Ombay Group.—The most westerly member of the
is Lombok, separated from Bali by the Lombok Strait, only a few mi
width. The island is only twenty-five miles long, and its rivers are neces
small, while the lakes it contain are only old craters. Rinjani, the hi
summit, which rises to 12,000 feet, has an ever-smoking top, and is of
clear landmark far at sea, when the rest of the island is hidden from
With the exception of a few Hindu Balinese, the inhabitants of Lom
known as Sassaks, are Mohammedan Malays, with a slight infusio
Hindu blood. They have a language of their own written in the Bal
character. For half a century they lived under the tyrannous yoke o
Balinese, by whom they had been subjugated, but in 1894, unable to
their oppression longer, they successfully appealed to the Dutch to ta
their cause. The Sassaks are skilled irrigators of their fields, which
large crops of rice and maize. They export the same products as
Balinese. *Ampanam* is the port of the island, and *Mataram*, a few
inland, was the residence of the Balinese Rajahs. The next island, Sumb
a larger island, is nearly cut in two by an immense bay, on the east e
which rises the famous volcano Tamboro, 9,100 feet high, whose erupti
1815 was only less disastrous and far reaching in its effects than that of K
tao in 1884. *Bima* and *Sumbawa* are the capitals of the two sultanates
which the island is divided. It is celebrated throughout the Archipelag
its fine breed of horses. The island of Flores, separated by a small
and two straits from Sumbawa, is 220 miles in length, and although
narrow, the interior is hardly known. Its inhabitants are mainly fri
haired Melanesians of Papuan origin, occupying the interior, and M
traders on the coast. *Larantuka*, the administrative capital, is its
known town and its most frequented port. The islets of Adenara, S
Lomblen, Pantar and Ombay, standing on the eastern end of the Lom
Flores bank, are very sparsely inhabited.

Sumba, which diverges in a north-west and south-east direction f
the general trend of the chain, is almost surrounded by deep water.
inhabitants, who are pagan Malays, are excellent agriculturists, and l
exporters of cattle and horses, which are shipped from *Nangamesi*
Makassar traders.

Timor.—The little islet of Savu, having a Hindu population, fo
stepping-stone to Timor of which Rotti, which lies under its west co
is but a separated fragment. Timor, the largest of the Lesser Su
Islands, 300 miles long, diverges from the line of the Sunda island ch
On both sides the depths exceed 1,000 fathoms. Its rocks are lar
Palæozoic age. Few of its rivers are large, none are navigable,
many of them meander through deep and wide valleys full of shin
in which gold occurs in apparently considerable quantity. The pe
are of very mixed pedigree. They appear to be Melanesians (w

tions of Indonesian or Polynesian intermixture), Malays, and els form the intermixture of these. At the coast there are Chinese, Bugis and Solorese. Their agriculture is very poor; maize being ain staple of their food. Numerous pigs are reared by them. religion is paganism, tinctured here and there with Christianity. ountry has been all parcelled out into "kingdoms," each ruled Rajah or Dato; nearly every one of which has its own language lect, though only a few miles may separate their capital villages. Portuguese, who occupied the whole island prior to 1613, were from the western moiety by the Dutch, who have since retained sion of it with *Cupang* as the capital.

rtuguese Timor.[1]—The greater part of the island of Timor gs to Portugal. The Portuguese portion includes the north-eastern the island, with *Dilli*, the best seaport, as the capital of the colony, is an autonomous district for which a special administrative sation is being introduced. The geological structure of Timor is in oral formation and in part schistose. The reported existence of volcanoes has not been confirmed. There are only small streams, ost important of them being the Lois. The climate is healthy in the ainous districts; but has a bad reputation on account of the fact Dilli is built on low and marshy ground. Timor coffee is of quality, and the plantations are progressing greatly. Cocoa, g, pepper, and sandal-wood grow well. Petroleum occurs and, regularly worked, will become a source of wealth to the island. are traces of gold, but no veins have been found. The area of uese Timor is about 7,000 square miles, and the population amounts at 300,000.

stern Sunda Islands.—Wetta and the Serwatty Islands are ed partly by Christianised Malays and partly by Papuan Melane- The Timor-laut group, terminating the Lesser Sunda chain, con- hree larger islands — Larat, Yamdena, and Selaru — and about maller. They are mainly upraised coral-reefs, peopled by Papuan sians, and Malays with Polynesian and Papuan blood in their veins. ttle is known of even the larger members of the group, and all ller are perfectly virgin ground to the geographer and the bio-

[1] By Captain Ernesto de Vasconcellos.

STATISTICS OF MALAY ARCHIPELAGO.

(*Mainly estimates about* 1895.)

Province.	Area in sq. miles.	Population.	Density of Popul per sq. m
Philippine Islands	115,000	7,500,000	65
Luzon	—	3,057,000	—
Bisaya	—	2,213,000	—
Mindanao	—	750,000	—
Adjacent Islands	—	22,000	—
British Borneo	84,000	493,000	6
British North Borneo	31,000	175,000	5
Brunei	3,000	18,000	6
Sarawak	50,000	300,000	6
Netherlands-India[1]	584,000	34,000,000	58
Java and Madura	50,500	25,700,000	509
Sumatra and Islands	184,000	3,450,000	19
Dutch Borneo	212,700	1,180,000	5
Celebes	71,400	1,998,000	28
Moluccas	43,800	400,000	9
Lesser Sunda Islands[2]	65,600	1,164,000	17
Malay Archipelago	783,000	42,000,000	54

POPULATION OF TOWNS.

Manila (*Philippines*)	150,000	Djokdjokarta (*Java*)	90,000
Soerakarta (*Java*)	150,000	Samarang "	80,000
Soerabaya "	130,000	Palembang (*Sumatra*)	50,000
Batavia "	100,000	Bandjermassan (*Dutch Borneo*)	45,000

ANNUAL TRADE (*in pounds sterling*).

(*Estimates about* 1895.)

	Philippines.	British Borneo.	Netherlands-Ind
Imports	2,100,000	900,000	13,500,000
Exports	4,100,000	1,200,000	18,700,000

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[1] Not including Dutch New Guinea. [2] Including Bali.

BOOK III.

AUSTRALASIA AND POLYNESIA

CHAPTER XXXI.—THE CONTINENT OF AUSTRALIA

By C. H. Barton, B.A.,
Maryborough, Queensland.

ıstralia.—Australia, the least of the five continents, with its rn satellite, Tasmania, stands aloof, both in character and situation, he world at large. Unlike any of the other great land masses, it lies within the southern hemisphere, without either encroaching on the rial region or approaching, even remotely, the antarctic circle. No continent is so evenly parcelled out among the torrid, subtropical, nperate zones; none so deeply lapped in great ocean expanses as ı the one prominent land area in what is known as the "water hemi-" Severed from Africa by an average interval of 4,500, and from America by 8,500 miles, it differs from both not merely in outline, he proportion that its longitudinal extent—41°, or about 2,360 miles, o the *average* width from north to south—17½°, or 1,050 miles. In of the zones most exposed to prolonged solstitial heat is there to be nother example of a land so proportioned, and at the same time so withdrawn from equatorial or polar influence. Long ages of n from the rest of the world have impressed on this outlying region d singularity in aspect, climate, and natural products. Isolation is dominant characteristic; indications of affinity with other regions and obscure. Only on the north-west, where the myriad isles of ı suggest a former connection with Asia, does Australia make any towards the clustered continents of the "land hemisphere." Even rection the nearest opposite points—North Cape in West Australia, e Romania, at the extremity of the long-drawn Malay peninsula—1,800 miles apart; while the average interval between the Asiatic ralian continents exceeds the breadth of the North Atlantic between sh Islands and Newfoundland. Of neighbouring islands, New separated from the north coast of Australia by the Arafura Sea, rait, and the Coral Sea; and the New Zealand group, some 1,200 ant on the south-east, are the most important. The south-eastern

peninsula of New Guinea, together with New Caledonia and N Island, form stations in a vast curve running approximately parallel east coast of Australia, while a second and larger curve can be through New Ireland, the Solomon Islands, the New Hebrides, ar Kermadecs, to Cape Runaway in northern New Zealand. The ou more easterly of these two curves is studded with volcanic vents, the one only at the southern extremity, where both are merged in a se active volcanoes, Tongariro, Ruapehu, and Ngauruhoe, the culmi points of the New Zealand plateau.

Coasts.—The continent of Australia is reniform in outline; the w lobe imperfectly rectangular, while the curvature of the eastern des about two-thirds of an irregular ellipse. Simple and compact, the cor presents only two important deviations from the general outline—A Land and Cape York Peninsula, both projecting northward towards Guinea, and enclosing the spacious, almost land-locked, Gulf of Carpe The only other striking indentations of the coast are the Great Aus Bight, extending from Cape Pasley to Cape Catastrophe; and the gulfs Spencer and St. Vincent, between Cape Catastrophe, Yorke sula, and Cape Jervis. The Bight and Carpentaria jointly determi division of the continent into a western and an eastern half, differing little from each other in aspect and physical conditions. Thus the w half has a more angular contour, studded with bold promin more and larger estuaries, but fewer rivers, and not half a dozen th navigable above tidal influence. Long tracts of coast show no s drainage to seaward, and there is but one solitary example (Sturt of a watercourse of any length flowing towards the interior. Th much uniformity of surface, and except in the far north-west and barrenness and poverty of organic life are the prevalent characte The eastern half possesses, on a less accentuated outline, more av harbours, roadsteads, and rivers, together with some 1,500 miles of navigation. The mountain systems are higher, more intricate an tinuous; they play a greater part in attracting and distributing mo in diversifying the surface, and so favouring the development of a fauna and flora.

Islands.—Of the islands belonging to Australia, the great major mere rocks, others are practically unexplored, or are uninhabited, o only local importance. Tasmania, the largest, alone claims mention. Cut off by Bass Strait from the south-eastern portion mainland, a former connection with which is still attested by cha intervening islets, the offshoot differs greatly in outline from the mass. The heart-shaped contour presents a concave northern front prominent convexity of the opposite main; the broken coast is st with projections and indentations; and the southerly position of the —between lats. 40¾° and 43½°—exempts it from the peculiar climati ditions that affect Australia proper.

Configuration and Hydrography.—Superficially, Australia re-ents the exposed portion of an irregular, partly submarine plateau, an average submersion of 600 feet, the remains of an older nge-shaped continent, reaching from lat. 50° S. to the equator, including Tasmania, New Guinea, Timor, and the Moluccas. Proof subsidence sufficient to break up the continuity of the mass is d in the extreme shallowness of the Arafura Sea and Carpentaria ; the swampy shores of the latter ; the concentric trend of the rs that empty into it from the south ; and above all in the Great rier Reef, extending nearly 1,000 miles along the north-east coast at an age distance from land of about 30 miles (Fig. 294). Of the inland , nearly two-thirds is occupied by the Great Austral Plain. Flanked on y side by mountains or tablelands, and sloping more or less gradually rds a central depressed lake-region, the outfall of a vast system of nd drainage, this en-sing feature is by no ns the unbroken level its name implies. ghts of land or un-ting downs indicate water-partings ; flat-ed hills, the ruins of nce continuous rock-with, here and there, e scattered mountain ips of bolder aspect, livide it into lesser cavities of varying ex-. . Of the subdivisions created, the basin he river Murray, in eastern half of the continent, alone has an outlet to the sea. All other subdivisions constitute systems of inland drainage ending in e lake basins, where not absorbed by the soil or lost through evapo-n. The outer portions of the great plain merge into tablelands essed to seaward by mountain chains, whose trend follows, ap-imately, that of the coast. Chief among them is the Great Divide, ning from long. 142° E. on the south coast to Cape York, parting the fic waters from those that flow westward, throwing out secondary es on both sides of the main axis, and giving rise to the not numerous class of Australian watercourses that deserve the name of s. The courses of those on the Pacific slope are of no great length, hey carry ample volumes of water, and are liable, in rainy seasons, to tent but brief overflows. Those on the landward slope have courses eat length, carry but little water, and are flooded only at long intervals,

FIG. 289.—*Hydrography of Australia.*

The Murray, the main artery of the Murray-Darling system, is an
tion, being regularly fed during the dry season by the melting snows
Australian Alps.

The south-western coast, between Cape Leeuwin and Shark
flanked by another but shorter mountain chain, the scarp of a hug
plateau extending inland, whose scanty drainage is discharged thro
series of defiles into the Indian Ocean. On the semi-peninsular proj
that diversify the coast north and north-east from Shark Bay, oth
regular mountain masses are planted whose radiating trend roughly
sponds with the prominences of the shore line. The south coast, as
the head of the Great Australian Bight, for more than 700 mile
sists of a line of cliffs over 500 feet in height, merging further ea
into extensive sand-dunes. This side of the continent presen
phenomenon of a coast line nearly 1,000 miles in length, unbroken
discharge of even the smallest watercourse into the ocean.

The drainage area of Carpentaria Gulf is bounded on the south b
downs, in which the coastal rivers discharging into it take thei
Nearly equidistant from the east and west coasts a system of p
chains, with a general west-north-west and east-south-east strike, occ
with some intervening tablelands and valleys, the centre of the con
Lastly, the wedge-shaped bulk of Flinders Range striking north fron
Spencer and St. Vincent, and finally bifurcating to the east and
indirectly connects the central system with the more distant outlying
of the Great Divide.

The rivers of Tasmania all drain into the sea. The two princip
Derwent, flowing south, and the Tamar, north, both rise in the c
lake-studded tableland round which the mountains cluster in det
masses up to 5,000 feet in height. A smaller plateau of similar cha
occupies the south-western angle of the island, and from one or ot
these elevated regions the larger rivers derive their chief supply.

Geological Structure.—Geologically, Australia ranks amon
oldest existing lands. Two-thirds of the surface is overlaid with the
of Mesozoic and Tertiary sandstones, which must once have covere
interior with an unbroken sheet. In the south-west denudatio
exposed the underlying granite over an area of from 25,000 to
square miles, while the central ranges, and those of the western p
Arnhem Land, afford strong evidences of metamorphic agency. C
west and south-west of the Gulf of Carpentaria is a large irregular a
Jurassic age, and strata belonging to the same system reappear o
opposite side of the Gulf, in association with crystalline and trap ro
the south and middle of Cape York Peninsula. In the Great Divi
granite combines with Silurian, crystalline, and Carboniferous rocks t
a solid, terraced axis, on whose slopes the sandstones rest. Coal sea
good strength and high quality are worked at various spots alon
Pacific coast. There is apparently some reason to believe that the

untain sandstone was formed by the action, not of water, but of wind ; process of the consolidation of wind-drifted sand into sandstone being ble at Fraser Island (Hervey Bay), at Warrnambool on the south coast, l elsewhere. Flinders Range is mainly of Silurian origin, as is also the ater portion of Eyre Peninsula, on the west of Spencer Gulf. While re is no active volcano known to exist in Australia at present, evidences ecent volcanic action are found in "Australia Felix," a district between t Phillip and Cape Jaffa, within which no less than eighty-three distinctly rked volcanic cones, from 700 to over 2,000 feet high, have been counted, ides numerous lesser vents and crater-lakes (Fig. 301). Other volcanic ications are found in north-eastern Australia, where they are dispersed r an area of some 30,000 square miles. Such are the basaltic flows ut the Cape River, the Upper Burdekin, and the Lower Burnett ; h the congeries of dome-shaped craters and cones found, at intervals, ut the 20th parallel.

Tasmania is, in the main, of Silurian age. Much of the interior, how- r, and part of the east coast is Carboniferous or Jurassic, the two tems being separated by an intervening belt of crystalline formation, ng which, as in most places on the mainland, the richest and most fitably worked mineral deposits are found. Both continent and island remarkable for their immunity from severe earthquakes. There is, wever, an ironstone region about 450 miles due north from the head of Great Australian Bight, in the Central Ranges, where, about the mmer solstice, earthquakes of considerable force are stated to recur ost daily during the hotter hours of the afternoon. Apart from this ated phenomenon, due, no doubt, to local causes, the seismic energy played elsewhere is but feeble, a fact attributable, perhaps, to the nerous volcanic safety valves, which, at a safe distance of from 1,000 to 0 miles, protect the continent on the east, north-east, and north-west.

Climate.—The climate, though in the main healthy, is subject to nge vicissitudes. The summer solstice of the hemisphere coinciding n the Earth's position in perihelion, the heat at that season is intense, n in latitudes far south of the tropic line. The enormous longitudinal nt of the continent, over which the Sun, when nearest, is vertical for ly three hours out of the twenty-four, combines with a generally shade- surface to favour so continuous an absorption of heat as is only lleled in the African Sahara, where the summer Sun is more than a ion and a half miles farther away. The absence of lofty cloud-con- sing peaks in the central region, and the tendency of coastal chains to the sea-winds of their moisture, and deflect them from a horizontal to scending course, combine with the radiation of the Sun-parched rior to produce severe and protracted droughts. On the approach of er, when the Earth is tending towards aphelion, the obliquity and the nce of the Sun increase together ; the column of light, superheated hat rises from the inland region rapidly cools down into a dense

cushion of heavy cold air, exercising a strong lateral pressure on all and manifesting itself to the warmer coast regions as a nipping, b cold land-wind, lowering the temperature many degrees below th tudinal average for the season.

Rainfall.—The rainfall is so unevenly distributed, that whole di may be suffering from dr while others, not far distan the scene of great and destr inundations. At irregular int sometimes extending over s years, the most arid parts interior will thus for a few assume the appearance of a b less, though shallow, inland While the north-west and coasts derive their rainfall fro monsoons; while the east co bathed in showers condensed the south-east trade wind b Great Divide, varied with the a

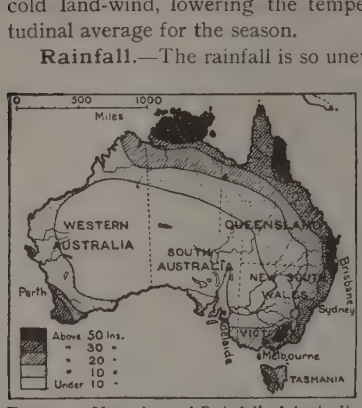

FIG. 290.—*Mean Annual Rainfall of Australia (after Supan).*

discharge from an occasional tropical disturbance; and while the sou parts of the continent, north to some 30° of latitude, owe their rainfa series of progressive cyclonic movements travelling eastward from source in the higher latitudes of the Indian Ocean—a very dry zone, 5° to 7° wide, stretches across the interior from the west coast to 141° E., over which the annual rainfall hardly averages 5 inches.

Temperature.—While subject to sudden diurnal changes, temperatures vary but slightly with the latitude; height and tance from the sea being the principal modifying factors. W the marine influence frost seldom occurs and insular conditions, as a rule, prevail; whereas inland, even at slight altitudes, strong contrasts of heat and cold will be felt even in the torrid zone. Coincidently with the setting in of the tropical rains, the south and centre are liable to hot winds and dust storms, which, however, serve to dispel miasma and purify the atmosphere. The climate of Tasmania has little in common with that of the mainland, resembling rather that of South Devon or the Channel Islands. The west coast, however, is at all times liable to severe g the summer is short, and the winter wet and boisterous.

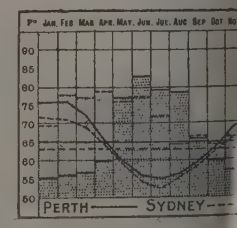

FIG 291.—*Temperature and R at Perth, W.A., and Sydney,*

Flora.—Organic life in Australia is in keeping with the singular na conditions that mark the region. The native flora, where not obscure

intrusion of East Indian types, bears a decidedly archaic impress. e numerous genera of arborescent myrtles, the proteads, casuarineæ, ucarias, cycads, ferns, lycopods, and other orders, whose maximum elopment reaches back to Oolitic, Triassic, and even Carboniferous es, recall conditions of plant development once universal, though at sent centred in, if not absolutely limited to, the southern continent.[1] e survival of these old-world forms was no doubt rendered possible by ong-continued process of slow adaptation to the increasing aridity of climate, as the ancient watercourses became obliterated through the thering of the former sandstone crust. Thus, in the more typical era, the foliage has acquired a tough, leathery texture that enables resist the wilting effect of excessive evaporation; or its functions are med by other organs, like the phyllodia or modified leaf-stalks of tain acacias, and the branches of the uarina; or again, in virtue of a slight st of the stalk, it presents no reflecting faces, but only narrow edges to the tical sunlight. Throughout the great rtaceous order, which far outnumbers other Australian types, the power of istance is increased by abundant se- tion of volatile oils, which renders the lular tissue impervious to the heat rays, l diffuses the delightful aroma peculiar the Australian "bush." Some of the alypts or "gum-trees" rival in dimen- is the Californian *Sequoia gigantea*. The est authenticated specimen of *Euca- us amygdalina*, felled on the Black r, near Melbourne, in Victoria, measured feet from the butt to a point where top had been broken off, and at 300 feet from the ground still had iameter of 6 feet. In the glens of the river Warren, Western tralia, *Eucalyptus colossea* attains a height of 400 feet, and the manian blue gum, *Eucalyptus globulus*, is but little inferior. Leguminous ts, chiefly represented by the genus Acacia, of which there are 300 ies, whereof some 250 are peculiar to Australia, rank next to the myrtles umber and extent of range. In company with the strange order of cads (*Banksia, Grevillea, Hakea, Helicia*, &c.), with the desert-loving fers (*Frenela* and *Callitris*), and with certain beef-woods (*Casuarina*), flourish where the hardiest eucalypts refuse to grow. The heaths, bundant in northern Europe and South Africa, are here represented

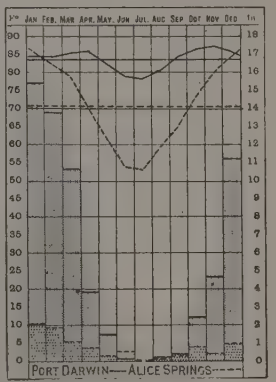

FIG. 292.—*Temperature and Rainfall at Port Darwin and Alice Springs.*

[1] South Africa and South America, for instance, both have proteads, and South America ucaria, while a species of casuarina is common to the greater part of Polynesia. ne three orders are nowhere found in association, except in Australia.

by the allied genus *Epacris*, of which some 300 species are enume
In addition to the orders already mentioned, Australia is rich in comp
figs, mallows, capparids, night-shades, spurges, rue-worts, sterculiads,
vines, madder-worts, asclepiads, succulents, labiates, chenopods, ver
water-peppers, sandal-woods, orchids, lily-worts, palms, and sedges. A
the more striking forms may be mentioned the baobab or "gouty-
tree (*Adansonia Gregorii*), the only other existing species of which
digitata) belongs to the African continent; the various species of
tree (*Xanthorrhœa*), arborescent rushes of strange aspect; the e
uncouth bottle-trees (*Sterculia*); the parasitic mistletoes (*Loranthus*
their variable foliage and brilliantly-coloured flowers; the "giant
(*Doryanthes excelsa*) with a flower-stalk thirty feet high; the stinging
(*Laportea*); and the gorgeous "waratah" (*Telopea*), with crimson f
heads visible half a mile away. Most of the coast region and much
interior is mantled with valuable grasses, of which seventy genera,
prising some 300 species, are indigenous.

Fauna.—The animal kingdom, so far as typically Australian,
quaint in aspect as the vegetation. Excluding sundry bats, a few ro
a feral dog, and certain marine forms, the native mammalia all b
to the primitive marsupial sub-class, and thus confirm the geological
of the antiquity of this zoological region. They comprise some fort
species of *Macropodidæ* (kangaroo tribe); about twenty species of phala
—variously misnamed "opossums," "flying squirrels," "native bears,"
four *Phascolomydæ* or wombats; ten of the *Peramelidæ* or bandicoot
and twenty dasyures or marsupial carnivores, including the "striped
and "devil," both confined to Tasmania, and now nearly extinct.
recently discovered pouched-mole, constituting by itself a distinct f
Notoryctidæ, seems to be confined to a patch of sandy desert north of
Eyre. Of still lower development than the marsupials are the monot
or egg-laying mammals, of which there are two genera, the duc
(*Ornithorynchus*) and spiny echidna. Their semi-reptilian anatomy
mines for these strange creatures a still higher antiquity than fo
marsupials proper.

The numerous avifauna includes, besides those common to other re
many characteristic forms. Such are the emu, cassowary, laughing
fisher, lyre-bird, black swan, bower-bird, and the mound-building
podes. Among the reptiles are to be noted two species of croc
frilled, thorny, and basking lizards; many venomous and harmless s
and sundry long-necked tortoises. The fishes, a more cosmopolitan
yet comprise several peculiar types, such as the lung-fish (*Cera*
freshwater herring (*Diplomystus*), and cod-perch (*Oligorus*), barra
(*Osteoglossum*), and others; most of them belonging to genera unrepre
elsewhere. Insects differ little from those of other continents.
curiosities of the arthropoda are a "whistling spider" from the we
interior, two species of Peripatus, and a burrowing crayfish, which

fills for itself an underground tank, wherein to spend the dry season. ong annelids, it will suffice to mention the giant earthworm of Gipps- l, which in favourable situations attains a length of six feet.

Aboriginal People.—Although there is little doubt that the north-west st of Australia has from time immemorial been frequented by Malayan ang fishers, the first reference to the aborigines occurs only in 1644, n Abel Tasman, the Dutch navigator, found himself seriously hampered is attempted examination of the west coast, by the hostility of the dians," as they were then called. And it was nearly half a century r when the first details of their personal peculiarities and habits were rded by the explorer Dampier. What their numbers may have been hat time it is impossible to conjecture, but calculations based on the of their diminution during the last half century, give warrant for ming that when settlement by Europeans first began, the aboriginal ulation was at least three times more numerous than at present.

Of black, or more precisely, dark brown hue, the Australian has few r negroid characteristics. In his high facial angle, straight or wavy , lustrous eye, ample beard, well-shaped limbs, and spare, muscular d, he approximates more to the Caucasian than to either the Ethiopian he Mongolian variety of mankind. Except for some slight resemblance physical appearance, language, and habits to the jungle Veddas of lon, the affinities of the aborigines of Australia with the outside world so obscure as to baffle inquiry. That they are virtually a survival the long dim past that dragged on unrecorded for centuries before earliest dawn of civilisation, there is no room to doubt. Nor is there valid reason for regarding them as otherwise than truly indigenous, coeval with the existing condition of the continent they inhabit. After l century of contact with this rapidly vanishing people, all that we yet v about them amounts to very little. As to their social development, still that of the earlier phases of the Stone Age, with which their ons and implements, the practice of infanticide, ritual mutilation and ibalism, the modes of sepulture, and the absence of chieftainship or other authority exactly correspond. That they have occupied the nent from remote antiquity is inferred not only from the occurrence rmous shell-mounds, the accumulation of many centuries, but from the very of innumerable human tracks and other impressions, together with nt cooking places and ash-heaps, within the substance of a laminated tone found on the south-west coast of Victoria. Amid much diversity ech, customs, and traditions there is yet such a general likeness as nts to proof of a common origin. A complex code of social observ- , especially in relation to marriage, prevails, with little variation, ghout the numerous tribes into which the nation is split up. Boys, aching puberty, are subjected to more or less cruel tests of endurance, r every condition of life vexatious and trying prohibitions of certain of food remained in force; the apparent aim of the system being to

weed out all the weaklings, to check the natural increase of popu
and to guard against any tendency on the part of neighbouring
towards mutual fusion.

The languages, although constructed on one general plan and so
more than dialectically distinct, yet show much diversity in the deg
elaboration or development; some varieties being almost devoid of in
mechanism, and correspondingly obscure, whilst others, such
Kamilaroi and the Parnkalla, have evolved a whole series of fairly r
grammatical inflections, and thereby gained vastly in precision.

The present number of the race is variously estimated at from 60
80,000, of whom, perhaps, two-thirds frequent the settled districts, v
dwindling balance still roam their native wilds unsubdued.

The Tasmanian aborigines, now extinct, had no kinship wi
Australians; their physical characteristics pointing to a Papuan or
nesian origin. Their number probably never exceeded 3,000.

These "provisional" types of mankind are now being superseded
civilised population of European, and predominantly British lineag
a slight and jealously watched infusion of Asiatic and Oceanic eleme

Discovery and History.—Although Australian history turns
on discoveries, it is doubtful when its shores were first sighted
European ship. Traces of a belief in the existence of an Austral con
are found more than two centuries before our era, due perhaps to
rumours spread by the Malayan trepang fishers. The geographer Pt
in A.D. 150, regarded it as an extension of the antarctic land region
modern research has restricted to the polar circle, and this notio
tinued to sway the earliest known account—by Wytfliet in 1598—in
"Terra Australis" is recognisable as the Australia of modern
Wytfliet describes it as "separated from New Guinea by a narrow
as beginning at "one or two degrees from the Equator," and as des
to rank as "a fifth part of the world." The discoveries of De Torres
eight years afterwards, navigated the strait which now bears his nam
of De Quiros, who designated the New Hebrides as "la Austria
Espiritu Santo," did not tend to clear up the confusion of ideas exp
in Le Testu's map of "Jave la Grande" (1542) and Descelliers'
Australle" (1550). The Dutch explorations of the north, west, and
coasts during the seventeenth century, and Tasman's discovery o
Dieman's Land and New Zealand (1642) gradually fixed the positio
dimensions of the continent, thenceforth known as New Holland
the most important and fertile region, that of the east coast, rei
wholly unknown until examined by Captain Cook in 1770.

With the arrival of the "First Fleet" at Botany Bay under Go
Phillip in 1788, the history of Australia as a civilised land begin
earliest chapter deals with the struggles of the young settlement
difficulty and privation until 1813, when a track was found across the
Mountains, which had hitherto barred access to the interior. This

the first impulse to inland exploration, while the circumnavigation of ania (then called Van Diemen's Land) by Bass and Flinders in 1799 our years later, to the official occupation of that island and its quent separation (1825) from New South Wales. The examination e coasts of the mainland, too, was proceeding apace. Flinders, in 2, had surveyed the southern coast-line, and during the next year mnavigated Australia for the first time. Oxley's exploration of the ıy tracts towards the west and north-west gave rise to the long and ornly maintained theory of an inland sea, while his discovery of the Brisbane in 1823 was followed within two years by the formation of ınch settlement at Moreton Bay. In 1824 the upper course of the Murray and the central parts of the present colony of Victoria were rsed by Hovell and Hume. Persistent rumours of an intended occun of Australia by the French now led to the planting of military (since abandoned) estern Port, at King ge Sound, Melville d, Raffles Bay, and Essington. The s 1827–30 were orable for Cunning- exploration of the ıg Downs, for Sturt's very of the river ıg, his boat voyage ıe Murray to and Encounter Bay, and unding of the Swan r settlement. In ations were formed tland Bay, in the subordinate province of Port Phillip, and on the Yarra, where Melbourne now stands. In 1836 explorations thence west and north revealed the rich volcanic district of Australia as it was then called.

FIG. 293.—*Political Divisions and Railways of Australia.*

elaide, the capital of the independent colony of South Australia, was d in 1836, and thenceforth exploration in the centre and the west ded rapidly. A further impulse to occupation and settlement was by the influx of population that resulted from the discovery of gold –52. Grey's explorations on the west coast; Eyre's journey round ght to King George Sound; Leichhardt's overland route from Downs to Port Essington; Sturt's expedition to the Barrier Range Stony Desert; Mitchell's discoveries in north-eastern Australia; crossing of the continent from Adelaide to Van Diemen Gulf; and nderings of the brothers Forrest and Gregory in the west and with the relief parties sent out after Burke and Wills, and the still

more numerous expeditions dispatched in search of Leichhardt aft
disappearance in 1847—soon shed so much light on Australian geog
as to leave little for future explorers to fill in. The distant depende
New Zealand had in 1840 been withdrawn from the control of New
Wales, and in 1851 the Port Phillip district likewise attained its ma
as the colony of Victoria. Shortly after (1855) responsible gover
was conferred on all the eastern colonies; Western Australia
continuing under Crown control, until the rapid increase of popu
consequent on the gold finds of 1890 paved the way for its auto
The contemporary history of Australia, as a whole, closes with th
clamation of a sixth colony in 1859, when the Moreton Bay District
a protracted struggle for separation from New South Wales, bec
self-governed State under the name of Queensland.

In 1901 the six colonies of New South Wales, Victoria, Queen
Tasmania, South Australia, and Western Australia, were federated in
Commonwealth of Australia, of which they became the original
The King is represented by a Governor-General, and the legi
authority is vested in a Senate and a House of Representatives.

STATISTICS OF AUSTRALIA.

	1901.
Area of Australia, including Tasmania and lesser islands (square miles)	2,972,9
Population, excluding aborigines	3,771,7
Density of population per square mile	1·3

LAND IN CULTIVATION.

	1880.	1890.	1901.
Acres	5,837,013	7,679,525	10,279,0

LIVE STOCK.

	1880.	1890.	1901.
Horses	1,068,402	1,509,669	1,625,0
Cattle	7,527,142	9,903,599	8,464,7
Sheep	59,175,024	97,878,619	72,120,0

EXTERNAL TRADE (*in pounds sterling*).

	Average 1871–75.	1881–85.	1891–95
Imports	36,945,000	46,316,000	52,542,0
Exports	37,344,000	45,316,000	55,879,0

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CHAPTER XXXII.—THE EASTERN STATES OF THE COMMONWEALTH OF AUSTRALIA

I.—QUEENSLAND

By C. H. Barton, B.A.,
Maryborough, Queensland.

Position and Coasts.—The colony of Queensland occupies the th-eastern portion of the Australian continent for an extent of 1,200 es from north to south, and 900 from east to west. The Gulf of pentaria and South Australia bound it on the west; the Pacific ean on the east; and New South Wales and South Australia on the th. It contains an area of ut 688,000 square miles, ng more than twice as large New South Wales. The sea-rd extends north and west n Point Danger in lat. 28° S. Cape York in 11° S., and on long. 138° E. on the south st of Carpentaria Gulf, thus uding the great Cape York insula, a tract larger than and, and the boldest promi-ce on the Australian conti-t. The Pacific coast, over 15° titude, is protected from the l of the outer ocean by the natural breakwater of the t Barrier Reef, thus ad-ing of coastal navigation g a smooth-water channel 5 miles long and from ten thirty miles wide. Other worthy features of the coast are the Wellesley Islands opposite t Parker in the Gulf of Carpentaria, enclosing a roadstead capable eveloping into a first class port; Endeavour Strait, between Cape and Prince of Wales Island at the extreme north; and a series ominent headlands separating bays along the east coast. Amongst are Edgecumbe and Repulse Bays, creating, with Gloucester and

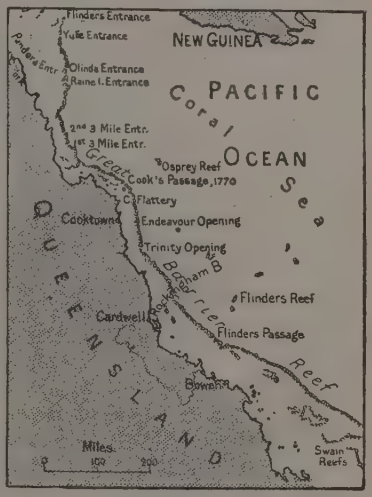

FIG. 294.—*The Great Barrier Reef.*

Cumberland Islands, the beautiful scenery of Whitsunday Pass
Capes Palmerston and Townsend, enclosing two spacious estu
Broadsound and Shoalwater Bay; Keppel Bay, with Cape Capricor
Curtis Island, almost on the tropic; Port Curtis, one of the best harb
on the Pacific coast; and Moreton Bay, partly sheltered by Moreton
Stradbroke Islands.

Configuration and Rivers.—The "Great Divide," receding
the Pacific shore and striking north-west to the 18th parallel as it p
into Queensland from the south, secures for that province a more diver
surface and ampler distribution of water channels than Australia,
whole, enjoys. The main axis of the water-parting throws off to
and left numerous spurs of considerable length, trending north
towards the coast and south-west inland. Most of these branch
secondary spurs of equal or greater height, which on the seaward s
averaging some 300 miles in width, give rise to a number of well-de
river systems, of which the Brisbane, Burnett, Fitzroy, Burdekin, Her
Normanby, and Kennedy are the chief. On the landward, or s
western slope, the great tributaries of the Murray-Darling basin, tog
with numerous feeders of inland drainage systems, flow south-we
south to their respective points of absorption. The Carpentarian B
with the western slope of the Cape York Peninsula, forms a dis
system draining into the gulf; the principal effluents being the L
ardt, Flinders, Gilbert, and Mitchell.

Geology.—Geologically, Queensland presents three parallel b
traversing the territory from south-east to north-west, in accordance
the general strike of the Pacific coast. The most westerly, of Cretac
origin, but surrounding a large wedge-shaped *enclave* of metamor
rocks, covers about two-fifths of the territory. It includes the Bly
dale Braystones, an older stratum of the same series, and a prolific so
of artesian water. The second belt, on the western slopes of the G
Divide and extending to Cape York, consists of sandstones of later, m
Tertiary, age, with patches of intrusive crystalline and volcanic ro
The third belt, comprising the rest of the province, exhibits the Pri
rocks (granitic, Silurian, Devonian, Permian, and crystalline) characte
of the Australian Cordillera, with extensive Jurassic and Carbonife
areas, where coal-seams of excellent quality are worked. Gold-be
quartz reefs and other mineral lodes are widely disseminated.

Climate.—Although Queensland is not exempt from the clim
vicissitudes to which all Australia is liable, their effects are less ma
than elsewhere. The extreme heat, fiery winds, rapid thermal chan
and bitter frosts common in the south and centre of the continent
almost unknown. Even in the hot and dry south-western region,
temperature rarely rises higher than 95° F., while the Cape York Penin
—within only 10° to 15° from the equator, enjoys, by reason of its
board and towering highlands, a more equable climate than many coun

assed as "temperate." The rainfall is very unequal. Over the Pacific ope it ranges from about 50 inches near the southern border to as much 100, and even 150 inches about lat. 17°, where the ocean vapours are rested and condensed by the twin peaks of the Bellenden Ker Mountains, 000 feet high. The rainfall of the Carpentarian plain and littoral, pending on the partly spent north-west monsoon, is much less, seldom ceeding 40, and often as low as 20 inches. In the west and south- est it is even more uncertain, some localities getting only 10 to 12 ches per annum, while others, not far off, receive 30 to 40. In all parts the colony droughts of greater or less duration occur at times, and again, e balance may be suddenly restored by widespread and destructive ods.

Flora and Fauna.—The flora, while conforming generally to the ustralian type, is enriched by the intrusion of eastern and oceanic forms, ving to the denser forests, or "scrubs," a distinct Indo-Malayan character. ere are found the red cedar, flindersia, alphitonia, hoop pine, and other cellent timbers, intermingled with a dense growth of palms, bamboo and wyer canes, caper shrubs, tree-ferns, orchids, and countless climbing or rasitic plants. Several of the most striking and valuable trees, such as the dwill pine, "turpentine," "silky oak," bottle tree, kauri pine, Leichardt e, calophyllum and "Queensland nut" are strangely limited in their bitat; hence some are on the verge of extinction as members of the ld flora. There are at least two indigenous species of banana, two of the *us* tribe, many edible figs, well-flavoured wild grapes, a mangosteen, hew and other nuts, the "Herbert-cherry" (*antidesma*), the "sour m" (*owenia*), nonda (*parinarium*), jujubes, raspberries, and other fruits. ndreds of square miles are covered with wild rice, tobacco, indigo, lt-bush," "Mitchell grass," and similar valuable herbs; screw-pines and ngroves fringe the coast, while the inland pools are gay with the grant red chalices of the "sacred lotus," or the blue, white, or purple als of various nymphæas.

The native fauna comprises most of the common Australian species, ides some peculiar to the region. Such are the tree-kangaroo (*dendro- s*), the five-toed kangaroo-rat (*hypsiprymnodon*), and several phalangers. dugong (*halicore*), a marine Sirenian, frequents the weedy estuaries bays on the coast. Fruit-bats (*pteropus; harpyia; carponycteris*) are a t plague, and, like that greater plague, the imported rabbit, seem to be he increase. Among the birds typical of this region are the pelican, na, regent-bird, bronze-winged and nutmeg pigeon, jabiru, and owary. There are two species of crocodile, and snakes (venomous otherwise) abound. The lung-fish (*ceratodus*) is confined to the rivers y and Burnett; the highly-prized barramundi (*osteoglossum*) to the ett, Dawson, and Carpentarian river-system. Turtles of fine quality are ght off the coast, where the shallows swarm with edible and pearl oysters, slugs (*holothuria*), sponges, corals, and other forms of marine life.

Aborigines.—The aborigines of north-eastern Australia differ slightly from their brethren in other regions, save in being taller and muscular; an advantage attributable to the ampler food supplies and more favourable natural conditions. They show some skill in the struction of their winter huts, canoes, weapons, implements for gathe and dressing food, woven bags and baskets (frequently watertight), laces and other personal ornaments; and, when first met with, evidently taken a step or two on the ascending plane, which, in the co of ages, might have led them on to civilisation. Many of the stron and fiercest tribes are now extinct, or represented only by a survi handful, the whole number probably not exceeding 20,000 (1898).

History and Government.—The territory now known as Que land was discovered by Captain Cook in 1770. For fifty years it rema unvisited, save by runaway convicts, until in 1825–6, a branch p establishment, subordinate to Sydney, was founded at Brisbane, Mor Bay. The dependency was first thrown open to free settlement in between which date and 1861, when the first census was taken, population, originally insignificant, increased to 30,000. Separation New South Wales was effected, after years of tation, in 1859. For a long time afterwards, the of immigration from England, Germany, and c European countries was defrayed by the State. present Asiatic and Pacific sources are being tap in order to meet the demand for low-priced lab As a result, the population is more mixed than in other Australian province.

FIG 295.—*The Badge of Queensland.*

The government is of the "responsible" pattern, differs from that of the United Kingdom chiefly in the wider suffrag payment of an annual allowance of $1,500 to each elected member of legislature, and in the functions of Grand Jury devolving on the Attor General. There is a Governor appointed by the Crown, a nom Legislative Council of indeterminate number—usually about 35—ar Legislative Assembly of 72 members, elected by 61 constituen Primary education, free, secular, and (nominally) compulsory, is un the care of the State. Higher education is imparted in ten gram schools, governed by elective trusts, and liberally subsidised by Gov ment. There are also ten "orphanages" under Government inspect and maintained chiefly from State funds.

Resources, Industries and Trade.—Amongst the resources Queensland, pastoral wealth—such as wool, hides, meat and tallow—sta first, closely followed by the yield from the many rich gold, coal and fields; silver, copper and other mines. The chief agricultural prod are sugar and rum; maize, wheat, rice; sorghum, guinea-grass; w arrowroot, bananas, sweet potatoes, tobacco, coffee, cotton; oranges, p apples and other tropical and European fruits. The forests abound

dar, pine and other useful timbers, and a large fleet of vessels find em-
yment in the pearl-shell, trepang, oyster, turtle and dugong fisheries.
In 1896–7 pastoral leases covered nearly two-thirds of the whole sur-
ce, whence live stock, hides, horns and bone-dust; frozen, preserved
d salted meat; tallow, and wool were exported to the value of three-
ths of the total exports. The mining industry, pursued on twenty-two
oclaimed gold, silver, copper and tin-fields, was accountable for nearly
o-thirds of the balance. The value of agricultural exports—sugar, fruit,
lasses, maize, arrowroot, rum, hay, wine, was about one-tenth of the
hole. Manufactures, in the ordinary sense of the term, are limited to
e supply of home requirements. Sugar factories, saw-mills, flour-mills,
eweries, and co-operative cheese and butter factories are the most im-
rtant. All the towns above the status of mere villages are lighted either
gas or electricity, and supplied with water by pressure through service
pes. Boring artesian wells, to supplement the scanty rainfall of the far
st, is being carried on with satisfactory results; 341 water-yielding bores
1898 sufficed by their surplus supply to convert
ny water-courses formerly dry into permanent
reams. This yield, which is steadily increasing,
eady equals in irrigating effect a yearly rainfall of
inches over 108,500 square miles.

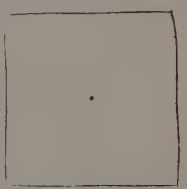

FIG 296.—*The average population of a square mile of Queensland.*

Communications.—In addition to steamers
at ply regularly along the coast, internal traffic is
omoted by more than 2,500 miles of State railways
ig. 293). Of the four main lines, the Southern and
estern connects Brisbane with Sydney on the one
nd and with Charleville and Cunnamulla on the
ner; the North Coast Line connects Brisbane with Gladstone, by
y of Gympie, Maryborough and Bundaberg; the Central extends from
ckhampton to the river Thompson; and the Northern, from Townsville
Hughenden and Winton. Numerous branches assist the traffic along
se routes, while shorter detached lines connect Mackay with the sur-
nding villages; Bowen with the Burdekin delta; Croydon (gold-field)
h Normanton, on the Gulf of Carpentaria; Cairns with the table-
d of Cape York Peninsula, and Cooktown with the Palmer gold-field.
merous coaches ply to and from all terminal stations, connecting
h places outside the railway system. The postal and telegraph arrange-
nts are very complete.

Divisions and Towns.—For administrative purposes Queensland is
ided into twelve districts; numerous counties (which are added to from
e to time); about 120 divisional boards and six shires for local taxation
improvement; together with a still larger number of parishes, which
hosen term refers solely to land survey and not to any scheme of
lesiastical rule. Thirty-one of the centres of population, mostly mere
ages, are under municipal government.

The coast-line is dotted with harbours, most of which are becor active industrial and commercial centres. *Brisbane,* on a river of same name, and the seat of government, owes its growth chiefl that circumstance, to the proximity of the rich pastoral and agr tural lands of Darling Downs, and to lavish expenditure on the leg ture and civil service. The site of the city is low and exposec floods, and the twenty miles of river that form its port are kept c for over-sea vessels only by incessant dredging. Ambitious public b ings, planned on a scale out of proportion to present needs or ne overlook the leading thoroughfares. Well-kept botanic gardens, accl tisation grounds, museums, libraries, schools of arts, an art galler technical college, and numerous scientific and other societies make the "gentle life"; while the infirm and aged poor find a comfort retreat in the asylum at Dunwich, a beautifully-wooded island in Mor Bay. St. Helena, another of the same group, is the enforced abod Queensland's felonry.

Northward along the coast follow in succession: *Maryborough,* bend of the river Mary, twenty miles from Hervey Bay, with l foundries, saw-mills, cane and orange cultivation, and the shipping por the Wide Bay district and Gympie goldfield; *Bundaberg,* near the m of the Burnett, on the edge of a large area of rich volcanic soil, a c munity wholly given over to the manufacture of sugar; *Gladstone,* wit splendid deep sea harbour, Port Curtis—in 1847 the scene of an abo attempt to found a colony provisionally named North Australia- outlet of a large mineral district, and one of the few places on the c adapted for embarking horned cattle; *Rockhampton,* the destined ca of central Queensland, the main outlet for wool and other pas produce, and the gate leading to Mount Morgan, the richest gold r in the world. Then, *longo intervallo,* come *Mackay,* another sugar to *Bowen,* renowned for its harbour and the length of its jetty, but unfav ably placed for inland traffic; *Townsville,* the principal shipping of northern Queensland, and connected by rail with the gold-field Ravenswood, Charters Towers, and Cape River; *Cairns,* where teeming jungle soil yields rice, coffee, sugar, cacao, and other tro crops in perfection, while a railway, that ranks as the boldest enginee feat ever attempted in Australia, leads towards the rich mineral field Herberton, Chillagoe and Etheridge. The most northern settler on the Pacific coast is *Cooktown,* on the Endeavour River, where Cap Cook careened and repaired his ship. It is connected with the Pa gold-field by a railway 31 miles in length.

Thursday Island, about 30 miles north-west from Cape York, fortified imperial coaling-station, the headquarters of the pearl- fishery, and a place of call for the Indo-European mail steamers.

The most northerly inland town is *Charters Towers,* the leading g field; others are: *Gympie,* on the site of an earlier gold discovery,

alling the former in importance; *Ipswich*, at the confluence of the ers Bremer and Brisbane, the oldest inland settlement, with woollen d cotton factories and adjacent coal mines; *Toowoomba* and *Warwick*, ıch frequented sanatoria, 2,000 and 1,500 feet above sea-level, and osperous seats of that agricultural industry (principally concerned with eat cultivation) which flourishes on the rich, black loam of Darling wns; *Mount Morgan*, with its "mountain of gold," which has paid four d a half million sterling in dividends since its discovery in 1885; and merous other centres of less note.

STATISTICS.

	1881.	1891.	1901.
a of Queensland (square miles)	668,497 ..	668,497 ..	668,497
ulation of Queensland (excluding aborigines) ..	213 525 ..	393,718 ..	503,266
sity of population per square mile	0·34 ..	0·71 ..	0·75

POPULATION OF CHIEF TOWNS.

	1881.	1891.	1901.		1881.	1891.	1901.
bane (10-mile radius)	36,169[1]	101,554	119,428	Ipswich	7,576	7,625	15,246
rters Towers ..	4,385	4.597	20,976	Gympie	7,659	8,450	14 431
khampton	12,412	13,380	19,691	Toowoomba	6,270	7,007	14,087
nsville	7,860	8,564	15.506	Maryborough	8,700	9,281	12,900

ANNUAL TRADE OF QUEENSLAND (*in pounds sterling*).

	Average 1871–75.	1881–85.	1891–95.
Imports	2,596,000 ..	5,888,000 ..	4,875,000
Exports	3,583,000 ..	4,056,000 ..	9,028,000

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II.—NEW SOUTH WALES

By Edward A. Petherick.

Position and Extent.—New South Wales, the oldest of the Austra- colonies, originally comprehended the eastern half of the continent, l the jurisdiction of the earlier governors extended also over Tasmania, w Zealand, and other islands of the Pacific. Since the foundation of province of South Australia in 1836, and the erection into separate onies of Victoria in 1851 and Queensland in 1859, the boundaries of w South Wales have been roughly within 28° and 37½° S., and 141° and ' E., and its area a little over 310,000 square miles. The frontage to Pacific Ocean, including the inlets of Port Jackson, Botany Bay, Port nter (or Newcastle), Port Stephens and Twofold Bay, is over 800 miles.

Configuration of Coastal District.—The Great Dividing Range Cordillera of Australia, which extends from Cape York to Wilson's montory, passes through New South Wales in broken ranges at a

[1] Without suburbs.

distance of 30 to 120 miles from the sea, and with an elevation of 4 to 7,000 feet. West of Sydney, where they present a precipitous bar and are composed of horizontally stratified sandstone, broken by cany deep gullies, and chasms due to aqueous erosion, they are called, f their appearance, the Blue Mountains. The more northerly are know the New England and Liverpool Ranges, and those to the south as Cullarin, Gourock, Manaro, and Muniong Ranges, the last-named forn part of the Australian Alps, their highest point being Mount Kosci (7,336), 700 feet above the limit of perpetual snow, and the loftiest pea the continent. The coastal district on the eastern slope of these ra is about 50,000 square miles in area and very fertile, being watered number of rivers, nearly all of which are navigable for a consider distance from the sea. From the valleys of the Alps the Snowy r makes a circuitous course and passes southward to the ocean, thr the Gippsland district of Victoria.

Configuration of the Interior.—Behind the Cordillera, w presents its abrupt front to the ocean, broad, elevated tablelands undulating plains form the chief pastoral districts of the colony. northern plateau is drained by tributaries of the Darling or Barwan, w also receives streams from the south of Queensland. With these wa the Darling is navigable in rainy seasons for 1,700 miles. The sout plateau is drained by the Murrumbidgee, which rises in the Austra Alps and is navigable for 500 miles, the Lachlan, its tributary, ar number of smaller streams traversing the Riverina District. Thes well as the waters of the Darling, flow to the Murray, which is only outlet for a drainage-area of over 300,000 square miles. It is a of drought and flood, for all the rivers mentioned, except the Mu which is fed by the snows of the Alps, stop running in dry seasons; in very wet seasons the lower lands of the far interior are inundated weeks. West of the Darling, and on the South Australian border, Grey and Stanley or Barrier Ranges rise from 1,000 to 2,000 feet. streams flowing from them are soon lost in the desert. The only of importance in New South Wales is Lake George, 25 miles long a miles broad, situated in the southern ranges, 2,100 feet above sea-level is salt, and for a long period before 1852 its bed was quite dry.

Climate.—The climate naturally varies according to locality. northern part of the coastal district is dry and sub-tropical, the central southern parts more temperate. The air is clear and the sky generally cl less. At Sydney, though occasionally rising above 100° in the shade mean temperature is 63°; snow is unknown and frost never severe (Fig. At Albury on the upper Murray, at Deniliquin in the Riverina District, at Bourke on the Darling, the range is greater, winter being much colder summer much hotter. The extreme of heat is felt inland, where temp tures of 130° in the shade have been reported. Hot winds accompa by dust blow during the height of summer, but they are not unhea

the coastal district the rainfall varies from 30 inches in the south to 73 the north, the average at Sydney being 50 inches. In the highlands on e Queensland border it is 35, at Deniliquin 17, at Wentworth, the junc-on of the Darling and the Murray, the lowest part of the interior of the lony, it is 12, and in the Barrier ranges on the west only 9.

Flora.—Open forests cover nearly the whole of the tablelands and terior plains, the characteristic tree being the eucalyptus in its many rieties. The plains west of the Darling and on the lower Murray are vered with stunted bushes or *mallee* scrub. A considerable portion of e coastal district is covered with brush forests, the valleys being filled ith tree-ferns, a red and white cedar, silky oak, tulip-wood, a lofty ash, lonial pine, and other timber trees. Economic plants are very numerous; eir productions include oils, perfumes, drugs, dyes, tans, fibres, gums, d resins. There are many useful and some noxious grasses. European ees and the beautiful Norfolk Island pine have been acclimatised, hile European plants and flowers oom all the year round. Unrtunately, imported briars, burrs, d thistles have spread all over e country.

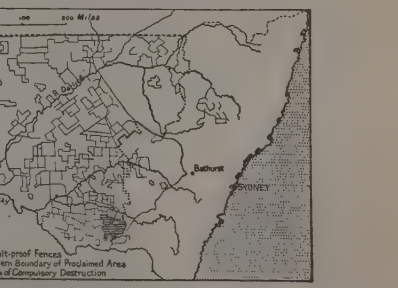

FIG. 297.—*The rabbit-proof fences of New South Wales.*

Fauna.—The indigenous anials of New South Wales are e egg-laying monotremes—the atypus and native porcupines *chidna*); marsupials—including veral varieties of kangaroo, possums," native bear, wombats, ndicoots, native cat, several ecies of rodents, insectivorous ts, and the flying fox. Sperm and whalebone whales, other cetacea, d seals are found off the coast. Snakes, harmless and venomous, are merous, and so are lizards (including iguanas six feet in length), toises, tree and swamp frogs. Birds exist in extraordinary variety d are notable for plumage, song and powers of mimicry. They include ds of prey, cockatoos, parrots, parroquets, and lories; the "laughing kass," and other kingfishers; the beautiful lyre and bower birds, ound-thrushes, doves, wood-pigeons, numerous game birds, and one the largest of running birds, the emu, which being treated as a xious animal, like the kangaroo, native dog, "opossum," and rabbit, rapidly becoming extinct. The multiplication of the common rabbit s seriously affected pastoral pursuits in many districts, and 17,000 miles rabbit-proof fencing have been erected in the effort to subdue the pest. e whole western frontier is fenced in this way. The camel has been climatised in the Darling districts. Over 300 species of fish (of which re than 100 are edible) are found in the rivers and on the coast.

Aborigines.—Although the aborigines were estimated at one m when the colony was founded, probably their number never exceede hundred thousand on the whole continent, and in New South Wales now number about 7,000, of whom 3,000 are half-castes. Low in present scale of humanity, some of their usages and customs see imply a higher origin or the adoption at some distant period of usage customs of a superior race, perhaps castaways or shipwrecked surv from another continent. Internal quarrels, the loss of their natural and their destruction by firearms or adoption of the vices of the Euro have been the chief causes of their rapidly diminishing numbers, and race is now fast fading away.

Resources.—Though New South Wales is very rich and varied i mineral wealth, the chief resources are wool and other animal prod Of wool, over 200,000,000 lbs. are annually exported, but owing to dro this is less than in the early nineties; some flocks number over 10 sheep, chiefly merinos. Silver and gold, tin, copper, iron, and r precious stones are found. Coal is abundant in the coastal dist especially at Newcastle, Illawarra, and Lithgow, the annual output b 5,500,000 tons; that from Newcastle alone exceeding 3,000,000, and seams now being worked are calculated to be sufficient to keep u present rate of production for 500 years. Manufactures are numerous not at present sufficient for home supply. Breweries, meat-prese factories, boiling-down and wool-washing establishments employ 50,000 hands. Most of the trade is with the United Kingdom and B possessions.

Discovery and Exploration.—The coast of New South Wales have been seen by Spanish vessels as early as the middle of the sixte century, but from the time of Mendaña's discovery of the Solomon Isl in 1568, the voyage of Torres in 1606, and that of Tasman in 164 European vessel is known to have been in the sea between New Zea and Australia until Cook crossed it and came upon the Australian coa 1770. He surveyed the whole of the eastern coast, took possession, named it New South Wales. Several attempts to scale the per dicular cliffs of the Blue Mountains were made, but no one effe their passage until 1813, when they were crossed by Wentworth, land, and Lawson, who discovered the extensive tablelands at summit. Evans and Oxley continued the exploration, discovering Macquarie in 1815, the Lachlan and Castlereagh, Liverpool Plains, another passage to the north near Port Macquarie during 1817 1818. Several expeditions were undertaken into new country to the during the following five years. Hume and Hovell crossed the Murra some of its upper tributaries and reached the sea at Port Phillip in 182 1825. The northern tablelands, including the Darling Downs, the Dumaresq, Gwydir, and Condamine, were discovered by Allan Cun ham in 1827. Sturt traced the Lachlan and the Murrumbidgee to

Murray, and the Murray to the sea in 1829 and 1830, and Mitchell completed the solution of the problem of the river system west of the Great Dividing Range by tracing the courses of the rivers discovered by Oxley and Cunningham to the Darling, and the waters of the Darling to the Murray, between the years 1831 and 1836. The country and ranges to the west of the Darling, Cooper Creek, and the desert beyond in the heart of the continent, were explored by Sturt in 1844 and 1845, himself and party suffering terribly from heat and thirst.

Settlement and History.—New South Wales was founded as a penal colony for the relief of English prisons and hulks as far from civilising influences as it was possible to go, and the first twenty years of its history is a record of hardship, famine and deprivation. The first fleet under Governor Phillip arrived in Botany Bay January 20, 1788, but finding a more suitable position for a settlement at Port Jackson, landed there on the 26th of January. The transported people were for many years utterly dependent for food and other necessaries upon supplies sent intermittently and irregularly from the other side of the world, at a time when voyages each way averaged seven months in duration. Disheartening calamities also came upon the few free settlers farming the banks of the Hawkesbury; several times their homesteads and produce were swept away by floods.

Under the early governors who, as a rule, were naval officers absolute and arbitrary in the exercise of their power, the military officers secured the monopoly of all trade, including that in spirits. Governor Bligh, already noted in the eventful history of the *Bounty*, having stopped his trade, and quarrelled with Macarthur (who was engaged in laying the foundation of Australia's future industry by importing the finest breeds of merino sheep), the military party arrested and shipped him out of the country. This ended the quarter-deck government and brought about a change in the policy as well as in the character of the governors. After an interregnum of two years General Lachlan Macquarie, the next governor, laid out Sydney and other towns, made roads across the mountains, erected public buildings, encouraged exploration, and took a paternal interest in the settlers. At the end of his twelve years' administration the colony was prosperous and flourishing. The population then numbered 40,000, more than half being free or emancipated persons. A measure of representative government was conceded about 1825 in the shape of a legislative council of nominated members. After ten years' fierce agitation transportation to this colony ceased in 1839. The next twelve years is a record of the extension of legislative privileges—representative and municipal government having been introduced in 1842—of considerable progress in pastoral, grazing, and agricultural pursuits, unfortunately marked by much speculation in land and live stock; this, and the cessation of imperial expenditure on transportation, and the cost of free labour, caused a financial

collapse, the country being saved from ruin by the introduction o new industry, tallow production by the "boiling-down" process.

The districts south of the Murray were separated as the colony Victoria at the beginning of 1851, and a few weeks later by the g discoveries in the Bathurst District, New South Wales emerged from purely pastoral state into a vigorous national existence, stimulating indust enterprise, claiming constitutional rights, and receiving responsible gove ment in 1855. From the time of the arbitrary governors the public affair the colony had been administered nominally under successive Minister the Crown (in reality under the control and direction of irresponsi officials) in London. The Moreton Bay district and territory to the no was constituted a separate colony under the name of Queensland at end of 1859, leaving the older colony her present territory and a populat of 300,000. Thenceforward the material progress of New South Wa though for a time out-distanced by that of Victoria, has been steady continuous, and she stands once more at the head of her sister States population as well as in material wealth and its attendant advantages.

Government.—There are two Houses of Parliament and an execut chosen and presided over by the Governor, who is appointed by the Que the depository of the prerogative of mercy within colony, and who also nominates the members of Upper House or Legislative Council, assents to vetoes Bills or reserves them for consideration of sovereign, as he may be advised by the law officers the Crown. The Governor of New South Wales Commander-in-chief of the armed forces of the colo and was, prior to 1855, "Governor-in-chief," "Governor-General" of all the Australian colon

FIG. 298.—*The Badge of New South Wales.*

The members of the Upper House hold their seats for life; members the Lower House or Legislative Assembly are elected by manho suffrage, and by ballot; parliaments are triennial and the members paid. For political and territorial purposes the colony is at present divid into 141 counties. Three-fifths of the population is under munici government. The administration of justice, as in the other Australi colonies, is similar to that of England, local enactments being found upon the laws of the mother country. There is no established churc primary education is compulsory, and free to children of parents una to pay school fees. There are numerous technical schools and wo shops, libraries and schools of art, agriculture and engineering, gramm and high schools, and a university in Sydney founded upon the model University College, London.

Railways and Communications.—A network of good coa roads covers the settled districts; the telegraph penetrates to all occup territory, and four trunk lines of railway with their branches, bring most important, and some of the more distant towns, into daily commu

tion with the capital, which is also connected by direct lines with risbane, Melbourne, and Adelaide (Fig. 293). Several great engineering forts have been necessary in the accomplishment of these public works, otably the bridges over the Hawkesbury and Murrumbidgee, and most nportant of all, the zigzag line over the summit of e Blue Mountains.

FIG 299.—*Average population of a square mile of New South Wales.*

Towns.—There are 188 boroughs and municipal stricts outside the metropolis, but most of these are mall towns; the only one at the census of 1901 which uld boast of a population exceeding 20,000 being roken Hill.

Sydney, the capital and the oldest city in Australia, unded in 1788, on one of the coves of Port Jackson, ow spreads over both the northern and southern shores that capacious, land-locked, and sheltered harbour, hich with its bays and coves possesses a deep-water frontage of over ne hundred miles. There is ample anchorage for fleets, and large vessels e accommodated at the wharves and quays of the city proper, which is ur miles from the mouth of the harbour. Sydney is the present terminus r all mail steamers between Europe and Australia; excursion steamers nd ferry-boats ply to all the marine suburbs, and the port is generally owded with coasting vessels and steamers trading to other Australasian orts and to the Pacific Islands. From the fact that Sydney is circumribed by bays and promontories, the streets present an old-world aspect; possesses noble public buildings, cathedrals, and churches, colossal warehouses, and very fine shops, and the residential suburbs are as a rule well built, the older buildings giving place to new and substantial edifices, while the shores of the harbour become more and more picturesque with the addition of villas and mansions and private and public gardens. Government House is situated in a princely domain overlooking Farm Cove, in which a man-of-war

FIG. 300.—*The Site of Sydney.*

ually lies at anchor, and adjoining the oldest botanical garden in ustralia. Centennial Park lies on the south side of the city. The ational Park, a few miles further south, contains 35,000 acres of the veliest woodland, forest, mountain, and river scenery, and has a frontage

of eight miles to the Pacific Ocean. One hundred miles west of Sydi in a deep valley of the Blue Mountains, are the marvellous limest Jenolan caves, as yet but partially explored.

Parramatta, literally "head of the waters," is at the head of the harb fourteen miles from the capital. It is the next oldest town in the col and, being extensively planted with oaks and other English trees, i essentially English in its appearance. It possesses orchards and orange which have a world-wide reputation, public buildings, residences of Syd merchants, and the homes of many old colonial families. A few mile the south, connected by a tramway with the main Southern line, are small towns of Camden, Campbelltown, and Narellan, on the Nepean ri important only from their situation in the midst of the estates of the M arthurs, Macleays, Cowpers, and other founders of Australian wealth prosperity. *Goulburn*, 134 miles south-west of Sydney, on the main South line, and 2,070 feet above sea-level, is the centre of the southern inland tr *Wagga-Wagga*, on the same line, and on the Murrumbidgee river, is most important town of the Upper Riverina District. *Albury*, someti styled "the Federal City," is on the north bank of the upper Murray, the station where trains are changed for Melbourne. *Newcastle*, principal seaport town north of Sydney, distant therefrom 62 miles water and 102 miles by rail, is the greatest coal-mining centre of southern hemisphere, and the outlet for the agricultural produce of Hunter river district. In addition to its coal industry, which emp nearly 10,000 men, the town contains several factories and smelting wo Twenty miles up the river, which is so far navigable, lies *Maitland*, a t of enterprising citizens, possessing fine public buildings, churches, scho and factories. The town, known as East and West Maitland, suff formerly from disastrous floods, but is now protected by stone emba ments. There are coal mines in the vicinity. *Grafton*, chief town of Clarence river district, 45 miles from the sea, has a large shipping tr is the centre of a rich agricultural district, and near mines of copper antimony. *Tamworth*, on the Peel river, 160 miles from Maitland and from Sydney; *Armidale*, the centre of a gold-mining, pastoral, and a cultural district, over 3,300 feet above sea-level; and *Tenterfield*, are ri and important towns on the Great Northern line, the last-named clos the Queensland border. On the Western and North-Western line *Bath* stands 144 miles west of Sydney. It was founded in 1815, well laid out broad streets, and now has fine buildings, factories, railway worksh It is the centre of an agricultural, pastoral, and gold-mining distr *Orange*, 190 miles west of Sydney, and nearly 3,000 feet above sea-le has a bracing climate, produces late fruit and the finest wheat. railway terminates at *Bourke*, on the Darling, 503 miles from Syd Lower down the Darling are *Wilcannia* and *Wentworth*; the latter the junction of the Murray, has a large river trade. *Hay*, on the lo Murrumbidgee, and *Deniliquin*, on the Edward river, are the chief to

the Western Riverina District; the latter is connected by railway with chuca and Melbourne, and most of the trade with the Riverina District, herefore, passes through Victoria. *Silverton* and *Broken Hill*, towns in he Barrier Ranges silver-mining district, 800 miles west of Sydney and ose to the South Australian border, are more easily reached by rail from delaide.

Dependencies of New South Wales.—Norfolk Island, situated bout 29° S. and 168° E., 1,100 miles distant from Sydney, discovered by aptain Cook in 1774, was occasionally used as a penal settlement for convicted criminals. The island was annexed to Tasmania in 1844 and gain used as a reformatory prison, but in 1855 the establishment was ithdrawn, and most of the descendants of the mutineers of the *Bounty* moved thither in 1856, though many returned later to Pitcairn. Since 865 Norfolk Island has been the headquarters of the Melanesian Mission. he inhabitants, who are lodged in well-built houses, occupy themselves ith planting, herding, and whaling, and the island is once more a depen- ency of New South Wales, with separate laws and regulations. It has a rtile soil, but no good harbour.

Lord Howe Island, a small island situated between Norfolk Island nd Sydney in 31½° S. and 159° E., discovered in 1788, and used as a place f call, is at present occupied by a few settlers, who supply vessels, chiefly halers, with vegetables. A magistrate has been resident on the island nce 1879.

STATISTICS.

	1881.	1891.	1901.
Area of New South Wales (square miles)	310,700	310,700	310,700
Population	751,468	1,132,234	1,359,537
Density of population (per square mile)	2	4	4

POPULATION OF CHIEF TOWNS.

	1886.	1896.		1886.	1896.
dney and suburbs ..	308,270	410,000	Grafton	4,000	6,000
ewcastle and suburbs ..	19,027	27,000	Orange	3,795	5,850
roken Hill	—	18,580	Albury	5,000	5,650
rramatta	10,287	12,500	Tamworth	4,400	5,400
ulburn	8,343	12,300	Wagga-Wagga	4,000	4,600
aitland (East and West)	8,910	10,600	Armidale	2,668	4,700
thurst	8,810	9,200			

RESOURCES OF THE COLONY IN 1896.

No. of Sheep.	No. of Cattle.	No. of Horses.	Value of Wool.	Value of Gold.	Value of Silver and Silver-lead.	Value of Coal.
48,319,000	2,226,000	510,600	£8,776,000	£1,073,000	£1,785,000	£1,125,000

AVERAGE ANNUAL TRADE (*in pounds sterling*).

	1873–75.	1881–85.	1891–95.
Imports	11,957,000 ..	21,168,000 ..	19,212,000
Exports	12,611,000 ..	17 489,000 ..	22,670,000

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III.—VICTORIA

By Edward A. Petherick.

Position and Extent.—Victoria, the most southerly of the color on the Australian mainland, and the latest settled, lies between 34° and 39 and 141° and 150° E., having New South Wales on the north, the Provi of South Australia on the west, the Southern Ocean, Bass Strait, and Pacific Ocean on the south. Its greatest length from east to west is miles, its greatest breadth 250 miles, and its area nearly 88,000 square mi about one-third that of New South Wales, of which it formed part u 1851, or one thirty-fourth part of the whole continent.

Coastal Features.—Two lofty capes, Otway and Wilson Prom tory, the latter a granitic mountain peninsula, forming the southernm point of Australia, project far into Bass Strait, and, with King, Flind and other islands, geologically link Tasmania with the continent. T principal inlets on the Victorian side of the Strait are Port Albert, West Port, and Port Phillip—an almost land-locked bay, 800 square miles in ar off which open Hobson's Bay, the port of Melbourne, and Corio Bay, port of Geelong (Fig. 304).

Surface and Natural Divisions.—Mountain chains and hilly rang forming part of the Great Dividing Range, traverse the country east a west, at a distance of 50 to 70 miles from the sea, throwing out spurs wh divide their northern and southern slopes into several basins, known as Murray (or North-eastern), Gippsland (or Eastern), Loddon (or Norther Port Phillip (or Central), Wimmera (or North-western), and Portland Western) districts. The eastern chains, or Australian Alps, rise to elevation of over 6,000 feet, amid magnificent scenery. There evidences of past glaciation, but snow now remains in summer only sheltered spots on the loftier summits. The highest peaks measured Victoria are Bogong (6,508 feet), and Feathertop (6,303 feet). Westw the ranges are lower, descending from 4,000 to 2,000 feet. The Mur District, on the northern slopes of the Alps, is drained by the Mitta Mi the Ovens, the Goulburn, and other tributaries of the Murray. T southern slopes of the Alps form the Gippsland District, watered by Margalong or Snowy river, which rises in New South Wales and flows the sea direct, and a number of smaller streams, which mostly unite a pass to the sea through a chain of tidal lakes. Count Strzelecki, w explored Gippsland in 1840, called it a noble province of arcadian beau possessing lofty mountains, magnificent streams, and fertile plains. T Loddon District is so called from the river of that name, which, with Campaspe and their affluents flow to the Murray from the northern slop of the Dividing Range and the Pyrenees. The southern slopes of th mountains form the Port Phillip District, drained chiefly by strea which find their way to Port Phillip Bay, the principal river being

rra Yarra. The Wimmera District occupies the north-western part of e colony, mostly flat country covered with stunted bushes or scrub, own as *mallee*. Several streams take their rise on the northern and stern slopes of the hills known as the Grampians, the Victoria and ack ranges, but these dry up without reaching the Murray, or lose themves in salt lakes. The Portland District lying south and west of the lastntioned ranges is well watered by numerous streams which unite with e Glenelg and other rivers flowing to the sea. This region is volcanic, aracterised by numerous detached and isolated hills, from 1,000 to 2,000 t in height, some showing extinct craters, and there are many salt and sh lakes. Hills, plains and valleys are well grassed, and are, for eep pasturage, perhaps the best in the world. Only two of the rivers, e Murray and the Goulburn, are navigable for any distance.

The geological structure of the colony has been indicated in the general apter on Australia. Palæozoic strata prevail with intrusions of granite d large masses of volcanic rock abounding in minerals. The weathering these rocks gives rise to a iety of soils adapted for e growth of a wide range products.

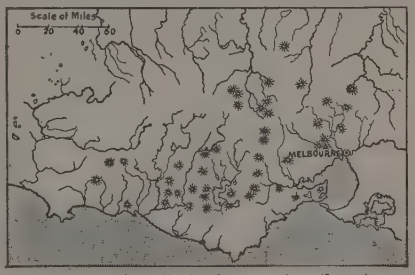

FIG. 301.—*The extinct volcanoes of south-western Victoria.*

Climate.—The climate more temperate than that any other part of Australia. e thermometer rises ocsionally above 100° in the ade—a dry heat—and may, a few nights in the year, f below freezing point, mean annual temperare over a long series of years being 57°. Spring is marked by sudden anges. In the summer months—December, January and February—t winds laden with fine dust occasionally blow from the north, but ense heat is succeeded by thunderstorms and refreshing showers. The nter months are June, July and August, but sunshine is rarely absent, atmosphere usually being as clear as that of Italy. The rainfall varies m 25 to 40 inches in the east and south, and from 14 to 20 in the th-west.

Flora.—Vegetation is sparse in the plains, giving the country a park-e appearance. In the ranges it is more dense and subtropical in its ms, but the predominating feature is the eucalyptus or gum-tree, hard l durable, valuable for making piles, railway sleepers and girders, yet able of a high polish for cabinet work. In the Gippsland District cimens of immense girth have been measured, 50 to 80 feet in circumence, and also of extraordinary height—considerably over 300 feet—one en tree has been estimated at 480 feet. The blue gum, famous for its

medicinal properties, has been acclimatised in malarial districts of south of Europe, in India, and in California. The consumption of tim for mining purposes has been enormous, yet it is estimated that over million acres of hardwood trees are yet untouched. Several specie acacia, or wattle, supply bark for tanning purposes. The gullies abound with a species of fan-palm, and with fern trees of gigantic grov there are multitudes of smaller ferns, altogether not less than 160 spe The desert tracts and mallee country of the Wimmera District are mor less interspersed with pasture grass and a great variety of salt bushes. I in time of drought, has been a very destructive agent. The ravages in forests are, however, soon repaired, for Australian vegetation is as rem able for celerity of growth as for abundance and variety, the eucaly species surpassing all other trees in this respect.

Fauna.—The animals of Victoria are similar to those of the adja colonies ; the dingo and native cat, the only carnivora, are practi exterminated ; the kangaroo driven out of the settled districts, and "opossum," owing to ruthless pursuit for its skin, largely reduce numbers ; the wombat and platypus are now rare. There are m species of lizards ; snakes are numerous, but only two or three species venomous enough to cause death. Of birds, the emu and native c panion are also rare, the lyre bird extremely so, but the smaller bir cockatoos, parrots, parroquets, laughing jackass, snipe and quail plentiful. Cattle, deer, and sheep, and the Angora goat have b acclimatised ; rabbits and sparrows have become pests.

Aborigines.—When the colony was first settled, the aborigines w still in the hunter and fisher state, nomadic, and without habitations. T numbers were then estimated at from 6,000 to 15,000. Although prote and cared for in villages and reserves, they have dwindled to less than Being very agile, intelligent, and acute in their sense of sight, they w of some service to the early settlers as shepherds, and in the police for

Resources.—The chief products are wool, the finest brands obtain in the world being those of Victorian growth, meat, hides, and other ducts of cattle, grain and breadstuffs, potatoes, timber, bark (for tan purposes), tobacco, hops, fruit and wine, all of which are exported, as as live stock, especially horses. Next to wool, gold (after an aggre yield of the value of £260,000,000) is still the principal product, altho the number of miners employed is now under 30,000. Nearly all gol now passed through the Melbourne mint and the total value exporte sovereigns and half-sovereigns is over £3,000,000 annually. Extensive b of brown and black coal are now worked in Gippsland ; building st limestone, and marble exist in large quantities, as well as kaolin and o clays. Fisheries are also an important industry, the principal supplie fish coming from the Gippsland lakes, Port Albert and Western P Fruit of all kinds is largely grown and exported. The manufactures of importance for home supply in almost all departments, but are not

ported to any appreciable extent. The principal imports are gold from other States (for minting), cottons, woollens and clothing, sugar, tea, al, iron, and steel. Over 80 per cent. of the total imports come from eat Britain and British possessions, of which in some years more and in ne years less than half is from the United Kingdom, India and Hong-ng. The remainder comes from the other Australian States and foreign untries, chiefly the United States and Germany.

Discovery and Exploration.—Part of the south-eastern coast was hted by Captain Cook in 1770, and Wilson Promontory was probably n during Cook's second voyage, by his lieutenant, Captain Furneaux, in rch, 1773. Ten years after the settlement of Port Jackson, George ss, exploring the coast southward in a whale boat, rounded Wilson omontory and entered Western Port, 5th January, 1798. A few months er Flinders and Bass demonstrated the existence of the Strait by circum-vigating Tasmania. The coast west of Cape Otway was discovered by eut. Grant in the *Lady Nelson* in 1800, and Lieut. Murray, continuing se explorations in the same vessel, discovered Port Phillip Bay in 1802, tered and took formal possession of it on March 9th. This port was again plored by Flinders in the following month, and a French expedition ing then on the coast, the importance of a settlement in the strait was ged upon the Home Government who sent out two transports with nvicts, their wives and children, a number of free settlers, and a military tachment under Colonel Collins, in 1803. Collins landed his people on arid ridge, inside Port Phillip Heads, and finding it unsuitable for a tlement soon removed to the Derwent near the present site of Hobart, smania. For twenty years the shores of Victoria were visited only by alers and sealers. Again, there were rumours of an intended French cupation, and a military detachment was sent from Sydney to Western rt by sea, and Hume and Hovell undertook an overland journey in 4–25, but being forced westward by the mountains they came out on western shores of Port Phillip Bay near Geelong. The Western Port ty was soon withdrawn. Ten years later, Mitchell, continuing Sturt's ploration of the river system of eastern Australia, ascertained that the rling joined the Murray, and crossed the latter into Victoria. The ntry, which he traversed in two directions, appearing to be more perate, richer, and more beautiful than any he had seen before, he ned it—the better to distinguish it from the parched deserts of the erior—Australia Felix.

Settlement and Growth.—Pasture land being mostly taken up in smania, applications were made as early as 1827 to the Sydney Govern-nt for the use of lands at Western Port, but were not granted. Pioneer lers removed their stock to Portland Bay in 1834, and others crossed to t Phillip in 1835 and purchased from a number of wandering aborigines act of land 600,000 acres in extent, the consideration being an immediate sent and a yearly tribute of goods. These proceedings were disallowed,

and the settlers warned that they were trespassers. At the same t their services to the colonisation of the country were recognised, and th or their heirs, were afterwards compensated. During the year follow Mitchell's explorations, a number of squatters on the Sydney side dr their flocks and herds over the Murray, more followed from Tasma and the news reaching the mother country, the tide of emigration be to flow towards Port Phillip in 1839.

An arbitrator was chosen from among themselves by the first sett until a police magistrate was sent to them from Sydney. Governor Bou visited the settlement in March, 1837, and approved of plans for a town the Yarra, to be called Melbourne, a second at Geelong, and a th Williamstown on the harbour, which, having been surveyed by Capt Hobson of H.M.S. *Rattlesnake,* was named Hobson Bay. As inc venience was caused by the necessity of referring matters to Sydne Superintendent was sent out from England in 1839, and provision made for local administration of justice. Melbourne was declared a free port in 1 and incorporated a town in 1842. Representative government being c

FIG. 302.—*The Badge of Victoria showing the constellation of the Southern Cross.*

ferred on New South Wales in the same year, members were allotted to the districts south of Murray, the population of which was 23,000, but inhabitants desiring the control of their own local aff petitioned for separation. This, after several ye agitation and a long period of financial trouble, granted at the beginning of 1851, with a Governor Legislative Council, composed of elective and no nated members. The discovery of gold in Califo having drawn away some of the population, the more recent discovery of gold in New South Wales (Febru 1851), threatening to draw away more, a substantial reward was offe for the discovery of a gold-field within the colony. In a few d former "finds" were verified, gold was unearthed in the nearest rang and in a short time richer fields were revealed than any previou known. Melbourne was soon emptied of its male inhabitants, and i few weeks Tasmania and South Australia were largely depleted. By end of the year immigrants came flocking in from all parts of the wo This influx continued for four years, the arrivals being from one to thousand weekly, the population increasing (in spite of departures) fr 78,000 in 1851 to 400,000 in 1856. A Commission assisted the Governo Council in controlling the operations on the gold-fields, which s extended over the greater part of the colony.

Government.—Responsible government was conferred upon colony in 1855 in the form of two Houses of Parliament, the lower hou whose members are paid, being elected by ballot and manhood suffra and a Cabinet of Ministers, responsible to Parliament, presided over b Governor appointed by the Crown. The population as in New Sou

ales, is largely concentrated in the capital. From the beginning of e influx of population the government was beset by the difficulty of ttling the people upon the unoccupied lands. Acts and regulations ore and more favourable to that end continued to be passed ; lands were rveyed expeditiously, and all possible facilities granted. Public works o were undertaken upon an extensive scale—main roads and bridges, lways and telegraphs, waterworks and reservoirs for towns and mining erations as well as harbours and lighthouses—with the result that more an half of the present largely-increased population is now settled in ral districts, 15 per cent. in country towns and not more than one-third the metropolitan area, which is a very large one. As a further induce-ent, in recent years, over 150,000 acres have been set aside in eighty-five fferent localities for homestead and village communities financially sisted by government, and labour colonies are also in operation to fit en for the duties of country life. Irrigation settlements at Mildura, on e lower Murray, have, despite financial difficulties, met with a large easure of success, and shown to what use the waste lands of the Mallee" country may be turned. National irri-tion works in the valleys of the Goulburn and wer Loddon, and storage works at Horsham in e Wimmera District, are entirely under State ntrol, and, like the railways, are the property of e State.

FIG. 303.—*Average population of a square mile of Victoria.*

Primary education is free, unsectarian, and com-lsory, free passes on the railways being granted the children of the scattered settlers. There are any public and private schools of a higher grade, chnical colleges, and a university in Melbourne. There is no Estab-hed Church.

Towns.—Municipal government having been granted early in the story of the colony local improvements have been carried on simultaneously th national works, with the result that the annual death rate is much low that of any European country, being under fifteen per thousand. nety-nine per cent. of the territory is locally governed in 60 urban tricts and 150 shires. Besides the capital, eight cities or towns have population exceeding 25,000 each ; but most of the country towns small. In addition to public offices, churches, schools, mechanics' titutes, and libraries, a special feature of the principal towns is their ks and recreation grounds. Scattered over the country also are the mesteads and mansions of the squatters and other magnates. A siderable part of the population, as in all young countries, is gratory in its habits ; for instance, nearly 100,000 migrated from toria to Western Australia and the adjacent colonies during the ancial troubles in 1893 and 1894—over 50,000 left Melbourne alone. ne of these have since returned.

Melbourne, the capital, the most populous city in Australasia and seventh city in order of size in the British Empire, with its sub including Port Melbourne and Williamstown, occupies over 200 sq miles. It is situated on the Yarra Yarra and Saltwater rivers, which crossed by fine bridges. Steamers of 8,000 tons now pass throug new channel from the port to wharves (eight miles in length) in the h of the city, and a dry dock at Williamstown can accommodate the la vessels. Ninety per cent. of the imports and exports of the colony p through Melbourne. The city possesses all the public buildings and mercial facilities of a first-rate European capital and seaport; the ho of parliament, vice-regal residence, university and affiliated college well as the parks, botanic and zoological gardens, may be particu

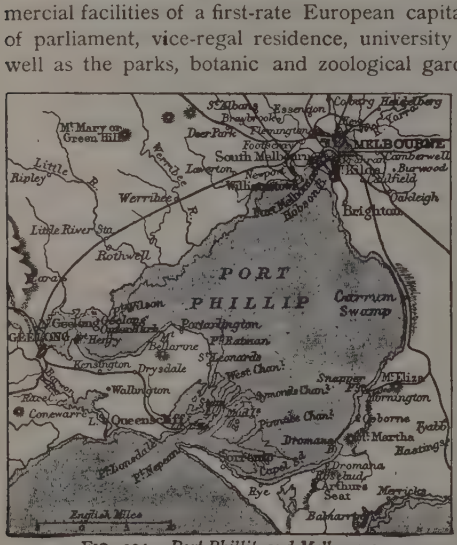

FIG. 304.—*Port Phillip and Melbourne.*

mentioned. In pi resqueness of situ and in beauty of a tecture—civil, eccles cal, and domestic— bourne and its sub rank with the finest of the old world. I ample water-supply all purposes, railways cable-tramways, an comprehensive schem sewerage is approac completion. There many favourite re of excursionists in vicinity on the shore the bay as well as in nearer mountain ra while the "Alps" can be reached by rail in a few hours.

Ballarat, the second city in Victoria and fifth in Australia, 75 north-west of Melbourne, stands at an elevation of 1,400 feet a sea-level, and has been for half a century the centre of the richest yielding district in the world. The "Welcome" nugget, weighing ounces, was found at Ballarat and sold for £10,500. The city, w is in the midst of agricultural and pastoral districts producing the f wool, is well laid out, has fine streets and public buildings, an artificial lake. Six lines of railway branch off to other mining t in the neighbourhood and all parts of the colony. *Bendigo*, form Sandhurst, 100 miles north of Melbourne, is the headquarters of an rich auriferous district, occupying 22 square miles, and containing distinct quartz reefs. This city possesses many fine buildings, a bo garden, a park, and various factories. *Eaglehawk*, four miles

ndigo, contains many rich quartz mines, and is an important town in elf. *Geelong*, situated on the Barwon and Corio Bay, 45 miles south-west Melbourne, is reached by steamer and rail. It possesses a fine harbour d all the public buildings of a prosperous commercial and manufacturing vn. It is the chief seat of the woollen industry in Victoria, and the lway connects it with Colac, Camperdown, Warrnambool, and Port iry, passing through the richest pastoral and agricultural districts. *arrnambool* is a seaport town, having a fine jetty and breakwater. Its ief export is dairy produce, and it possesses many fine buildings and tories, sea-baths, colleges, museums, gardens, and the coolest summer mate in Australia. At *Framlingham*, 18 miles from Warrnambool, the nnant of the Western District aborigines is sheltered. Between Geelong d *Queenscliff*, the pilot-station and the fortified entrance of Port Phillip—o a favourite watering-place—lies the most highly cultivated district in e colony, the formation being sand over clay.

Railways.—The above-mentioned towns are all connected by rail, e lines radiating from Melbourne (Fig. 293). The North-Eastern and rthern Railways tap the Riverina District of New South Wales at seven ints on the Murray, the navigable frontage of that river being nearly ght hundred miles. The North-Eastern line for Sydney crosses the river Wodonga for Albury, but change of carriage is necessary owing to lifference of gauge. The Northern Railway crosses the river, by an iron dge 2,000 feet long, at *Echuca*, the principal town on the Murray, the *repôt* for intercolonial trade, and junction for Deniliquin, the chief vn of the Riverina District. Echuca is also the centre of an agricultural d wine-growing district, and possesses immense wool stores and factories. anches of the same lines touch the river at *Yarrawonga* (where there is ther fine bridge), and at other points. There are other important vns in the northern and north-eastern districts rich in cattle, agricultural, l mining products, including *Mooroopna* and *Rutherglen*, centres of the gest wine-producing districts in Australia, and *Beechworth*, a mining centre l picturesque holiday resort, situated 1,770 feet above sea-level. From *ight*, a small town in the same district, there is an easy ascent to some the highest peaks of the "Alps." From Ballarat the North-Western nk line passes through thickly-timbered country to *Ararat*, the centre of astoral, agricultural, and wine-making district, and sends branches to mining town *Stawell* and to *Portland*, the oldest settlement in the ony, situated on the bay of that name, which affords anchorage for the gest vessels, and is the natural outlet for the Western District. From rat the main line proceeds to *Horsham*, the chief town of the Wimmera trict and a market for live stock, grain and fruit, and thence to Adelaide, ssing the South Australian border at Serviceton, no change of carriage ng necessary. The South-Eastern main line from Melbourne passes ough the Dandenong State forest and the recently discovered coal ricts to *Sale*, the chief town in Gippsland, and to the Gippsland lakes.

STATISTICS.

	1881.	1891.	1901.
Area of Victoria (square miles)	87,884	87,884	87,884
Population	862,346	1,140,405	1,200,914
Density of population (per square mile)	10	13	14

POPULATION OF CHIEF TOWNS.

	1885.	1895.		1885.	18
Melbourne and suburbs	345 380	460,371	Warrnambool	5,398	6,0
Ballarat	41,110	46,276	Maryborough	3,800	5,4
Bendigo	36,570	42,000	Stawell	4,900	5,2
Geelong	20,890	25,000	Castlemaine	6,000	5,0
Eaglehawk	7,650	8,476	Echuca	4,065	5,0

RESOURCES OF VICTORIA IN 1896.

No. of Sheep.	No. of Cattle.	No of Horses.	Value of Gold raised.	Value of Wool
14,000,000	1,900,000	435,000	£3,220,000	£5,250,000

ANNUAL TRADE OF VICTORIA (*in pounds sterling*).

	1871–75.	1881–85.	1891–95.
Imports	15,241,000	18,091,000	15,422,000
Exports	14,787,000	16,089,000	14,420,000

STANDARD BOOKS.

J. J. Fenton. "Victorian Year Book." Melbourne, *Annual.*
J. Bonwick. "Port Phillip Settlements." London, 1883.

IV.—TASMANIA

BY THE EDITOR.[1]

Position and Coasts.—Tasmania, the fourth and most south Australian colony of the eastern tier, is an island separated from Vict by Bass Strait (about 140 miles wide), and lying between the parallel 40¾° and 43¾° S. Its area is scarcely than that of Scotland, and it is the smal as well as the most temperate of Australian colonies. The north coast Tasmania faces the continent in a conc curve from the two ends of which line islands, the Furneaux group on the and Hunter and King Islands on the w stretch northward across Bass Strait, chains suspending a heart-shaped penda The indentations on the north and w coasts, although affording a few nat harbours—notably the narrow estuary of Tamar on the north, and Macquarie Harb on the west—are neither numerous important. The east coast is a little more broken ; but in the south-east corner the edge of the island is wrought into a singular complex fantastic peninsulas, amongst which the form of a recurved hook is

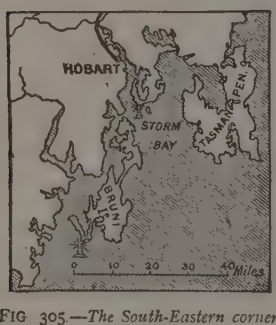

FIG 305.—*The South-Eastern corner of Tasmania.*

[1] Assisted by E. J. Hastings.

ated again and again on different scales of magnitude. In the heart of s rocky maze the estuary of the Derwent opens, access to it being mpered by many serious dangers before the days of lighthouses.

Configuration and Rivers.—Tasmania is essentially a highland gion built up mainly of ancient Palæozoic strata through which harder neous masses have been intruded. The result of the initial form and the erse materials is that the full rivers fed by the rain of the "roaring ties" have carved the surface into picturesque gullies and bold moun- nous slopes. An irregular range, or series of ranges, runs close along e east coast, rising in Ben Lomond to over 5,000 feet. It consists largely trap which has broken through the overlying sandstone, limestone, and ier strata now found in the valleys and lowlands. Volcanic forces have en active in recent geological time, covering large tracts of the east and ntre with lava, which, in decomposing, formed a very fertile soil. West this mountainous belt, the valleys of the Tamar, Macquarie, and Coal ers, and connecting lowlands form a line of depression affording means direct communication between north and south, utilised by the main nk railway of the island. Farther west, the whole centre is occupied by plateau much of which exceeds 3,000 feet in elevation, dominated by ort mountain ranges and isolated summits, including Mount Cradle 070 feet), the culminating point of the island. Bordering the plateau on e south and west there are several ranges of metamorphic rocks rising a considerable height. The highest part of the plateau in the north- st, not far from the centre of the island, is occupied by a remarkable oup of fresh-water lakes, situated in picturesque scenery, and likely to ove one of the most valuable resources of Tasmania by attracting visitors m the mainland colonies in the summer months. Great Lake, the gest, is about twelve miles long and four wide, and is situated at an vation of 3,800 feet above the sea. The principal rivers are the Der- nt, which rises in Lake St. Clair and flows south-eastwards for about miles to Storm Bay; the Huon, about 100 miles in length, flowing ough a rich forest region to D'Entrecasteaux Channel; the Tamar in the th, properly an estuary formed by the union of the rivers Esk and equarie which drain the great eastern depression, coming from the tern Ranges, and receiving tributaries from the central lakes.

Mineral Resources.—Tasmania is rich in minerals. Tin has been most extensively worked hitherto, the principal mining centres being Mount Bischoff on the north-west, and at Branxholme in the north-east. nable deposits of copper and antimony are being opened up at Mount ll, and silver in the vicinity of Mounts Zeehan and Dundas, in the west. is widely distributed, and large beds of coal, some of good quality, found in different parts; the mines of the Fingal basin in the east ly the Tasmanian railways. Other useful minerals are bismuth ore, s, marble, and excellent building stone.

Climate, Flora and Fauna.—The climate, on account of the pre-

vailing westerly winds, which moderate the heat, is the mildest and r
equable of any part of Australasia and shows well-marked seasons
resembles that of the south of England ; and, as in the British Island
gives a definite character to the land and its productions. The n
temperature in winter on the coast is 47°, and in summer 62° F. ;
in the highlands the winters are more extreme. The rainfall is mode
but, compared with that of the continent of Australia, ample and unifo
distributed. At Hobart the average is a little less than that of Lon
The vegetation is mainly of the Australian type, eucalypti being the
widely distributed. One species, known as the Tolasa Blue Gum, is
to attain a height of 350 feet. The Huon Pine is abundant in the so
The island was once almost entirely forest-clad, and large woodlands
remain yielding much valuable timber. The fauna also is, in general, sir
to that of the Australian continent, but a few forms are peculiar to
island, the most noteworthy being two species of carnivorous marsup
the famous Tasmanian devil and the native tiger, or striped wolf, bot
which have been hunted almost to extinction by the settlers on accou
the destruction they caused to sheep. Of 170 species of Australian b
about 15 are common to Tasmania, including a "
warbler" and one species of quail as large as a partri
The platypus is more common in Tasmania than in
Australian continent. Fish of various kinds are al
dant, and a very large and much esteemed crayfis
an article of export to the neighbouring colonies.

FIG. 306.—*The Badge of Tasmania.*

History and Government.—Tasmania, or
was first named Van Diemen's Land, was discov
by Tasman in 1642. Towards the end of the fol
ing century it was visited by several navigators, amongst whom
Captain Cook, who landed at Adventure Bay on the south-east c
in 1777, but did not recognise the insularity of Van Diemen's L
which was not proved until Bass and Flinders circumnavigated it in 1
In 1803 it was formally taken possession of on behalf of the British Cro
as a dependency of New South Wales, and a small convict settlement
formed at Risdon on the Derwent. This was transferred in the follov
year to the opposite side of the river, the site of the present capital.
island continued to be a dependency of New South Wales till 1825, w
it was constituted a separate colony, but transportation of convicts to
Diemen's Land continued until 1853. In 1856 the colony was gra
responsible government, and the name changed to Tasmania.
Governor represents the Queen ; the Parliament consists of a Legisla
Council and a House of Assembly, the members of both being elected.

Aborigines.—The Aborigines, who at the time of the British ann
tion numbered perhaps 4,000 or 5,000, are now quite extinct. A few h
breeds only remain on the Furneaux Islands. The history of the deal
of the British settlers with the aborigines is deplorable. From 1804, s

the planting of the first convict settlement, until 1832, when the es were almost exterminated, a "Black War" was waged, marked on sides by cruelty and treachery. In 1830 an npt was made to drive the surviving inhabitants a corner of the island, but it utterly failed. Subently after five years of effort, marked by countless ers and hardships, some philanthropic individuals eeded in gathering the remnant of the race toer in Bruni Island, whence they were afterwards oved to other stations, but it was too late, and ugh considerable attention was paid to the last ie Tasmanians they had dwindled to sixteen in , and the last survivor, an old woman of seventy-three, died in 1876.

FIG. 307.—*Average population of a square mile of Tasmania.*

ndustries and Trade.—Sheep-rearing and agriculture are the cipal occupations. Besides the crops grown for domestic supply, the important are fruit and hops. Much attention is devoted to the er, and fruit, both fresh and preserved, constitutes the chief agriural export. The leading exports are wool, gold, silver and tin, and imports textiles, various manufactured goods and provisions. The of the trade is carried on with the neighbouring colonies of Victoria New South Wales, and with the United Kingdom. The main line of ay runs from north to south between Hobart and Launceston, and e are several secondary lines. Coaches connect the principal town-, but facilities for internal communication are, as yet, very limited.

owns.—*Hobart* (formerly called Hobart Town), is pleasantly situated ie Derwent, on rising ground at the base of Mount Wellington (4,160 . The city is well laid out and has various handsome churches and r public buildings. Local industries include flour mills, jam factories, llen mills, tanneries, and important iron works, where materials for ay and bridge construction and steam machinery are produced. The our is spacious, deep and well sheltered. *Launceston*, on the Tamar, is second town in the colony, and the chief port of the north. It stands valley at the head of the estuary, between the Cataract and Windmill s; the former takes its name from picturesque falls in Cataract Gorge he South Esk.

STATISTICS.

	1881.	1891.	1901.
Area of Tasmania (square miles)	26,215 ..	26,215 ..	26,215
Population of Tasmania	115,705 ..	146,667 ..	172,475
Density of population per square mile ..	4 ..	6 ..	7
Population of Hobart	21,118 ..	24,905 ..	24,654
" Launceston	12,752 ..	17,108 ..	18,022

AVERAGE ANNUAL TRADE OF TASMANIA (*in pounds sterling*).

	1871–75.	1881–85.	1891–95.
Imports	1,027,000 ..	1,669,000 ..	1,336,000
Exports	911,000 ..	1,533,000 ..	1,400,000

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J. Bonwick. "The Last of the Tasmanians." London, 1870.
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CHAPTER XXXIII.—CENTRAL AND WESTER STATES OF THE COMMONWEALTH OF AUSTRALIA

I.—SOUTH AUSTRALIA.

By Edward A. Petherick.

Position and Extent.—The Province of South Australia lies betv 26° and 38° S. latitude, and 129° and 141° E. longitude, having We Australia on the west, New South Wales and Victoria on the east Southern Ocean on the south, and an area of 380,000 square miles. territory extending north of the twenty-sixth parallel to the shores o Indian Ocean, Arafura Sea, and the Gulf of Carpentaria, lying betv 129° and 138° E., the boundaries respectively of Western Australia Queensland, and containing 523,000 square miles, has also been unde administrative control of the South Australian Government since The "Province" and the "Northern Territory" together are 1,800 r in length from sea to sea, and in area are three times as large as South Wales, comprising indeed nearly one-third of the continent.

Coast.—The southern coast is deeply indented by Spencer which penetrates nearly 200 miles and includes Ports Lincoln Augusta, and by St. Vincent Gulf penetrating 100 miles, Yorke Penir lying between. Spencer Gulf is bordered on the west by Eyre Penin beyond which comes the Great Australian Bight. To the east o Vincent Gulf, Lake Alexandrina forms the outlet of the river Murray, a remarkable sand-spit runs south-eastward along the coast for n 90 miles, locking in a long narrow lagoon—the Coorong—against land. South of the gulfs is Kangaroo Island, 85 miles long, separated the mainland by Investigator Strait and Backstairs Passage.

The northern coast comprises the western side of the Gulf of pentaria bordered by several islands, and the much-indented north east coasts of Arnhem Land. Coburg Peninsula and the two islan Melville and Bathurst enclose a considerable area of water in Diemen Gulf, the south coast of which contains the inlet of Port Da Queen's Channel, the estuary of the Victoria river, forms the south-west corner of Arnhem Land.

The Interior.—Ranges of hills running northward from Cape J parallel with St. Vincent Gulf—the highest points, Mount Lofty (feet) and Razorback (2,830 feet)—divide the waters flowing eastwa the Murray and a few streams flowing to the Gulf. This part of

try is almost wholly arable land. The south-eastern district is largely posed of the same eruptive rocks which occur in the adjoining of Victoria; the most conspicuous of several ancient volcanoes is nt Gambier. The Flinders Range runs east and north of Spencer and Gawler Range westward, crossing Eyre Peninsula. Beyond are ying lands, and Eyre, Gairdner, Torrens, and other salt lakes which et seasons receive the waters of a vast extent of back country, in- ng streams from western Queensland. The waters thus received are rbed or evaporated during seasons of drought, when the interior s become an arid and burning desert. The surface of Lake Eyre few feet below sea-level. Further north, in the centre of the con- t, is an elevated tract of country, Larapinta Land, formed by the donnell and James Ranges, composed of rugged and barren rocks y 5,000 feet above sea-level. From these ranges occasional heavy rush down numerous channels to the Finke (native name, *Larapinta*) , flooding and fertilising the hot moving sands of the surrounding try, and rapidly producing a luxuriant growth of vegetation. Lake deus lies west of this region and partly within Western Australia. coastal districts of the Northern Territory are fairly well watered streams from ranges at no great distance inland, the chief rivers g the Roper, which flows into the Gulf of Carpentaria, the East, h, and South Alligators, the Adelaide Daly, and the North-Western oria flowing into the Indian Ocean.

limate.—The temperature of the Province varies considerably. At aide, during a long period of years the maximum observed for the th of January (midsummer) was 112°, and the mean day temperature the maximum for July (midwinter or rainy season) was 69°, and nean during the day 58°; the minimum observed was 34°. In the nt Lofty ranges, within an hour's journey of the capital, the tempera- is from 10° to 15° lower in summer, and in winter snow sometimes The prevailing winds, except in midsummer, are south-east; in ner they blow from the north, are hot and enervating, especially to e in feeble health, and severe upon tender or unprotected plants. In f of its general healthfulness it may be noted that the colony has r been visited by any epidemic. South Australia suffers more from ght than the other colonies—serious visitations occurring at intervals out eleven years; the last was in 1896–97. In Larapinta Land the ate is milder on account of altitude, with warm clear days and bright nights with light breezes, hot winds being rare—conditions which a marked influence on the indigenous life of that region. The ge rainfall varies from 13 to 30 inches at Adelaide—mean for 52 , 21 inches—and from 11 to 5 inches further north and west. In the ern Territory upon and near the coast which is affected by the oons, the mean rainfall is over 50 inches; at Port Darwin it is 63 s, and the mean annual temperature 82°. At Alice Springs, the central aph station, the rainfall is 11 inches and the mean temperature 70°

(Fig. 292); at Port Augusta, head of Spencer Gulf, 9 inches and 66
Eucla, on the Australian Bight, 10 inches and 63°.

Flora and Fauna.—South Australia and the Northern Terri
between the northern and southern gulfs, occupy the depressed area
covered by the sea between eastern and western Australia, which
geologically two islands, and its sparse vegetation partakes of the chara
of both regions. The eucalyptus predominates, though the trees do
grow to the size they reach in the other colonies. Grass trees,
edible roots, and shea oak abound in the south-eastern district;
sandalwood tree on Yorke Peninsula; saltbush in the northern distr
and "scrub" or mallee more or less over the whole Province.
vegetation of the Northern Territory is Australian, though with tro
grasses and sedges, mangroves on the coast, and the paper bark
which forms impenetrable thickets for hundreds of miles on the bank
the rivers.

The animals of the Province and the Northern Territory are gene
the same as in other parts of Australia except that alligators aboun
the northern rivers, and the wombat is found only in the south. An
life is abundant in Larapinta Land on account of the favourable clim
conditions, and includes a remarkable mole-like marsupial. An
insects, the white ant in the north is very destructive, necessitating
use of iron and steel for telegraph poles and railway sleepers. S
once found in great abundance on the shores of Kangaroo Island,
now rare; and the marsupial, which was so numerous when Flin
named the island, has there been long extinct.

Aborigines.—In 1876 the number of aborigines in the Prov
was under 4,000, in 1891 they had dwindled to about 3,000; the nur
in the Northern Territory is about 20,000. Those of the extreme n
were reported by early explorers to be cannibals, but there is no evide
of this since the settlement of Port Darwin. In Melville Island they
fierce and intractable. The aboriginal of Larapinta Land is describe
the living representative of the Stone Age, performing the most da
surgical operations with his flint knives; naked, hairy, merry, a mi
wonderfully agile, possessing an unerring hand that works in pe
unison with an eye keen as that of an eagle; without habitation, li
entirely upon the spoils of the chase; untameable; with no belief ex
in an evil spirit, or in traditions, he yet practises with scrupulous ex
ness the most painful and hideous customs, of the origin or reaso
which he knows nothing. Adopting the debasing habits of the white
he will soon have passed away.

Discovery and Exploration.—The northern coasts were regul
visited by Malays in search of trepang before the advent of European
the Malay Archipelago at the beginning of the sixteenth century.
first comers were Portuguese, from whose observations early account
the country and the inhabitants are no doubt derived. The D

yed the same shores during the following century. Ships of the h navy finally took up the work, Flinders in 1803, King in 1820, Stokes in 1839, when Port Darwin was discovered and named. The Australian Bight was sailed along in January, 1627, by a vessel d the *Golden Seahorse*, which carried the Dutch ambassador, Pieter s, to Japan, hence the name "Nuyts Land." This country being ed in the most favourable degree of south latitude, the Swiss pro- , J. P. Purry, proposed to settle it as a vine-growing colony in 1717 1718. It does not, however, appear to have been seen again until ry, 1793, when D'Entrecasteaux visited the coast in search of La se. Lieut. Grant, making the first outward voyage through Bass in the *Lady Nelson* in 1800, came upon the coast further east. ers discovered Kangaroo Island and completed the survey of the ern coasts in 1802. At Encounter Bay he met and gave copies of his s to Admiral Baudin, who brought them to Europe where they were shed with French nomenclature, Spencer and St. Vincent Gulfs aring as "Buonaparte" and "Josephine," and the whole country een Nuyts Land and New South Wales as "Terre Napoleon."

othing was known of the interior until Sturt sailed down the Murray in and Adelaide was founded in 1837, when Eyre and others made overland eys from New South Wales and Port Phillip. In 1841 Eyre, who had, time, discovered Lake Torrens, accomplished his more extraordinary ey round the Great Bight to King George Sound. Sturt made his xpedition (in 1844–45) to Cooper Creek (the Victoria of Mitchell) and reat stony desert, whence he was driven back after terrible privation partial loss of sight. Although exploring journeys were kept up, it ot until 1862 that M'Douall Stuart, in a third attempt, succeeded in ing the continent to Port Darwin. Burke and Wills's successful ex- tion, partly through the same territory, to the shores of the Gulf of entaria was accomplished the year before, but they perished at Cooper k on their return journey. Exploration in the interior has been con- d in private and government expeditions conducted by Warburton, st, Gosse, Giles, Lindsay, Favenc, Tietkins, Carnegie, and others, have left little of the interior that is quite unknown. Conducted by ecke, the Horn Scientific Expedition explored Larapinta Land in

istory and Government.—South Australia was founded by Act rliament upon principles advocated by Gibbon Wakefield, whereby ue from sales of land was to be devoted to the promotion of immi- n. The first colonists were sent out in 1836, preceded by a survey to examine Kangaroo Island, Port Lincoln, and other parts. A site town was chosen where Adelaide now stands early in 1837, and and country lands soon allotted. Divided authority, disputes en the officials and the colonists, and experiments in finance destroyed the self-supporting character of the colony, led to the

recall of the first two governors, and to the constitution of S
Australia as a Crown Colony. The new governor, Sir George
brought the affairs of the colony into shape, though for a time
necessary retrenchments pressed sorely upon the community.

FIG. 308.—*The Badge of South Australia.*

discovery of copper ore in 1843 advanced
Australia upon a career of prosperity and enter
interrupted, however, by the gold discoveries in
South Wales and Victoria in 1851, which drew
nearly fifty thousand men and for a time stoppe
local trade. Many returned in the following y
and land being cheap, the colony was saved
ruin by the energetic development of its agricul
resources, and the "farinaceous colony," as it
facetiously called, became for a long period the granary of Austral

Responsible government was conferred upon the colony in 1856.
members of the Upper House or Legislative Council are elected up
property qualification, those of the Lower House or Assembly by
hood suffrage. South Australian statesmen have led the way in
progressive measures of policy with good effect on the prosperity o
people. Public works and unleased lands are controlled by local au
ities. Hydraulic works have made many districts independent of an uncertain rainfall, and artesian wells, sunk in various places, chiefly along the overland line of railway, have conclusively proved the existence of enormous subterranean supplies of water. An irrigation colony, Renmark, similar to that of Mildura, is in operation on the lower Murray. Afforestation is under the direction of an Agricultural Department, and 7,000,000 trees have been planted in the Province since 1876. The chief products are wheat, which is largely exported, and copper, of which over £20,000,000 worth has been raised in the State since 1845; wine is an increasing industry. The total value of exports per head of population is far in excess of that of any other of the Australian States, and the acreage under cultivation exceeds all these colonies with the exception of Victoria. The imports consist chiefly of British manufactured goods. The most important public works yet undertaken have been the transcontinental telegraph, and telegraph lines to the borders (connecting the Australian systems, as well as those of Tasmania and New Zealand, with other parts of the world), and trunk lines of railway to the Murray and Victorian border, to Broken in New South Wales, to Spencer Gulf, and nearly half way across

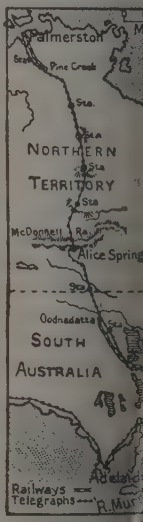

FIG. 309.—*The ... continental Tele... and Railway.*

tinent towards Port Darwin. Primary education is compulsory, secular free ; secondary education is afforded in private establishments, and re are government schools of mines and industry, of painting and gn, agricultural colleges and schools, a museum of natural products, anic garden, libraries, observatory, and university.

Towns.—Essentially an agricultural and pastoral country, the vince of South Australia possesses few towns containing more than hundred inhabitants, and with the exception of the capital and its urbs there are only ten with upwards of a thousand. *Adelaide*, the ital, sometimes called the "model Australian city," is well situated on lateau, on the river Torrens ; it has fine avenues and buildings, is ounded by a belt of park-land, several suburbs, including Glenelg and t Adelaide, and is within eleven miles of the summit of Mount Lofty, ascent to which is easy. The other important towns are *Mount nbier*, at the foot of the extinct volcano in the h-eastern district, centre of the "garden of the ony" ; north of the capital are *Gawler*, on a river the same name, situated in an extensive wheat-wing district ; *Kapunda*, noted for its copper es, worked from 1843 to 1879 ; *Kooringa*, con-ing the famous Burra mine. *Moonta* and *llaroo*, possessing rich copper mines and the gest smelting works in Australia, are on Yorke insula ; and *Port Pirie* and *Port Augusta* on Spencer f. All these towns are connected by rail with Adelaide. *Port Lincoln* a commodious harbour, and is the chief town on Eyre Peninsula, ch is occupied mostly by sheep farmers.

FIG. 310.—*Average population of a square mile of South Australia.*

Northern Territory.—Settlements were formed on Melville Island 1824 and at Raffles Bay in 1827, but both were abandoned in 1829. other settlement was formed at Port Essington on Coburg Peninsula in 8, as a military post and harbour of refuge, but this also was abandoned 1849. *Palmerston*, the capital (founded in 1869), occupies an elevated overlooking Port Darwin, one of the finest harbours in Australia, and tains the offices of the government Resident, the officials of the territory, of the telegraph departments. The transcontinental railway, which its terminus here, now extends to Pine Creek, 146 miles inland. The ıtry is well adapted for tropical and semi-tropical products, and is ;ved to be rich in minerals. A large extent of the territory is at ent leased for pastoral pursuits. Pearl fishing is carried on chiefly Melville Island. This island, about fourteen miles from the main-, is 75 miles long by 37 broad, covered with mangrove swamps dense forests, and inhabited by Australian animals and intractable igines.

STATISTICS.

	1886.	1896.	1901.
Area of South Australia Province (square miles)	380,070	380,070	380,070
„ Northern Territory (square miles)	523,620	523,620	523,620
Population of South Australia	304,336	355,286	362,604
„ Northern Territory (exclusive of aborigines)	—	4,934	4,000
Density of population, South Australia Province	1	1	1
Population of Adelaide and suburbs	128,377	140,406	163,430
„ Port Pirie	—	5,000	—
„ Kapunda	—	3,800	—
„ Mount Gambier	—	3,000	—

RESOURCES OF SOUTH AUSTRALIA AND NORTHERN TERRITORY, 1897.

No. of Sheep.	No. of Cattle.	No. of Horses.	Value of Wool.	Value of Copper.
5,092,000	540,000	180,000	£1,790,700	£238,000

ANNUAL PRODUCE OF WHEAT IN BUSHELS.

1883–84.	1891–92.	1893–94.	1896–97.[1]	1897–98.[1]
14,649,000.	6,436,000	13,618,000	2,804,000	4,014,800

ANNUAL TRADE (*in pounds sterling*).

	1871–75.	1881–85.	1891–95.
Imports	3,397,000	5,856,000	7,420,000
Exports	4,223,000	5,338,000	8,255,000

STANDARD BOOKS.

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II.—WESTERN AUSTRALIA

By the Hon. David W. Carnegie.

Position and Extent.—Western Australia includes all that port of the Australian continent extending to the west of the meridian 129° E., and is situated between the parallels of 13½° S. and 35° S. most westerly point, Dirk Hartog Island, is in longitude 112° 52′ E. State includes all the islands adjacent to the coast of the mainland in Indian and Southern Oceans. The greatest length is 1,480 miles, and greatest breadth about 1,000 miles, with an area of 975,920 square mi or nearly one-third of the whole continent of Australia, or equal in ext to one-fourth of Europe.

Surface and Agricultural Resources.—The coast-line is sl compared with the large extent of the territory, being little broken by b gulfs, or river mouths. Consequently, natural harbours are wanting. principal anchorages used are open roadsteads, only partially protect the most noticeable exception being Princess Royal Harbour, the in bay of King George Sound. At Fremantle, at the mouth of the Sw river on the west coast, harbour works of large extent are nearing co pletion. King Sound and Cambridge Gulf in the northern portion of colony are inlets of considerable size, and would appear to be fine natu harbours; but their value must be discounted by the great tidal ran

[1] Droughty seasons.

rise and fall of ordinary tides in Cambridge Gulf is 20 feet, in g Sound 46 feet. Further south the difference decreases, until on south and south-west coasts there is no tidal rise worth mentioning. triking feature on the south coast is the entire absence of rivers or n streams of any size until the extreme south-western corner of the itory is reached. High cliffs along the south coast form the abrupt nination of an elevated limestone tableland, which extends some 200 es inland between the meridians of 121° and 129° E. This tableland vinter has the appearance of magnificent pasture land, there being bably a fair rainfall. No surface water occurs, with the exception of ll rock-holes, and consequently the land has not been settled. In district cylindrical cavities in the rock are frequently found, reaching nknown depths, and known as "blow-holes" from the sound of rushing d that they emit. Along the south coast, west of 121° E., eucalyptus st land begins, and extends over the whole south-western corner of the ny, forming one of its richest resources. Here the immense Karri Jarrah trees attain a height of between 200 and 300 feet. Jarrah ber is extraordinarily durable, resisting the white ant and the *Teredo alis*, and consequently admirably adapted for railway sleepers, and s for bridges or sea jetties. Karri timber is largely exported, being d chiefly for wood paving. The forest land when cleared is eminently ed for agriculture.

Along the west coast there are numerous rivers; of these the Swan r is the most important, those further to the north being for the most mere storm channels filled only during the rainy season. The upied portion of the colony extends along the west coast for about o miles, the most thickly peopled part being that lying roughly ween Geraldton and Albany (King George Sound). Here farming and culture is carried on, the area for the cultivation of cereals lying south 28° S. The total area under crop is about 202,000 acres, the principal ps being wheat, barley, oats, maize, potatoes, hay of all kinds, green age, onions, and other root crops, and vines. As well as the grape a at variety of fruit is grown, particularly oranges, lemons, apples, and ches; and these are capable of being produced in large quantities. ween 28° S. and 20° S. the occupied portion of the colony follows the tern coast-line with a breadth of some 250 miles. In the valleys of numerous rivers, cattle and sheep stations have been established. th of the De Grey river an unbroken stretch of coast-line known as nty-mile Beach, a flat sand plain, the western extension of the great id desert, intervenes between the pasture lands of the north-west and ich Kimberley country, where, in the valleys of the Ord, Margaret, oy, and Lennard rivers, cattle, sheep, and horses are reared with ess. The total number of live stock at the end of 1900 included 68,000 es, 340,000 cattle, over 2,400,000 sheep, and nearly 4,000 camels, rted from India and South Australia. The pearl fisheries on the

north-west coast are important. Coal is found in the south-west of colony ; copper, lead, tin, iron, antimony, zinc, manganese, and asbes form the chief mineral resources, other than gold, as yet undeveloped, likely in the future to afford valuable returns.

Mountains and Deserts.—The mountains of the state are not great height nor of frequent occurrence. The most important range is Darling, which extents from the extreme south-western corner, runn parallel to the coast-line at a distance of 20 miles, for 300 miles to northward. Its highest point, however, is only 1,500 feet. The Stirl Range, 40 miles inland from Albany, attains a height of 3,500 feet, from its isolated position on the low coastal plain is visible for an imme distance. Mountainous country follows the western coast-line at a dista of 200 or 300 miles inland, giving rise to the rivers of that coast. H country is found in the north, in Kimberley Division, where the Leop and Müller Ranges attain a height of 2,300 feet. No mountainous cour of any extent occurs in the far interior, though numerous isolated hills ranges of sandstone are met with. South of 19° S. and east of 122½° E. elevated sandy tableland, roughly estimated at 1,000 to 2,000 feet above s level, cuts off the settled portions of the colony from the popula districts of South Australia. Between 26° S. and 31° S. the Queen Vict Desert lies, uninhabited except by a few scattered tribes of aborigi Undulating sand-hills, or sandy plains covered with dense acacia scr almost devoid of surface water, met the eyes of the few that have pe trated far inland. Low ranges and cliffs occur at intervals along parallel of 26° S. latitude. North of this lies Gibson Desert, a bar expanse of stones and gravel, reaching to the Tropic of Capricorn. Beyo this the great sandy desert rolls away to the northward, ridge succe ridge of drifted sand, parallel one to another, and stretching nearly due and west. These sand ridges, doubtless formed by the winds, vary height from a few feet to one hundred, the average distance between th being about 300 yards. It is an uninhabitable desert, waterless, and bar of all vegetation excepting that plant of spines and prickles commo known as Spinifex (*Triodia*).

The so-called lakes of the interior are merely vast sheets of stiff m sparkling with salt in the dry seasons, and covered after the rain to a de varying from a few inches to four or five feet with water which rapi becomes salt. To the west of the Darling Range numerous salt fresh-water lakes occur, but many of them also dry up in the sum months.

Geology and Mineral Resources.—Geologically, Western A tralia is built up of crystalline and schistose rocks ; including a great velopment of granite with auriferous quartz, quartzite and ironstone, in southern portion. On the west coast is a long strip of Tertiary formati and older deposits extending from the Carboniferous to the close of Cretaceous run in a comparatively narrow band along the north-west co

strip of Tertiary strata is separated from the Secondary formations by rrow transverse band of volcanic rocks.

Settlement has now penetrated over 500 miles inland, owing to the overies of rich gold deposits. The gold-fields may be said to form a , unbroken save by the Eighty-mile beach, running parallel with the st-line from Kimberley in the north to Dundas in the south, including arra, Ashburton, Gascoyne, Murchison, East Murchison, Yilgarn, unt Margaret and Coolgardie. The Kalgurli and Coolgardie gold-fields, nding to the 125th meridian, as well as other fields, are being rapidly eloped. The export of gold was 1,880,000 ounces for the year 1901, the total amount exported from the State from 1895 to 1901 inclusive about 5,700,000 ounces. Gold, therefore, forms one of the State's est sources of wealth, and the excitement caused by its discovery has acted a great increase of population. The imports chiefly consist of visions, machinery, ironware and clothing, while the exports are nly wool, gold and timber, but also include some tin, copper, guano, dal-wood, pearls, pearl-shells, and kangaroo hides.

Climate.—The climate generally is good and healthy, naturally ying considerably owing to the extent of the State. In the north it is ical, with a wet season between December and March, that is during hottest months. The heat is extreme, but away from the coast the air ry. On the north-west the same conditions hold ; but during the rainy nths tremendous cyclonic disturbances occur, causing great damage to stock and property. In the south and south-west the climate is perate for the greater part of the year, December, January, and ruary being the hottest months. In the interior the heat is extreme, not enervating, on account of the dryness of the air. During the ter months, June and July, the weather is often cold, and slight frost xperienced at nights ; in the far interior the thermometer has recorded ow a temperature as 17° F. in the very early morning. The annual fall varies from 33 inches at Perth to 21 inches in Kimberley, 10 es in the north-west, and 9 inches in the Coolgardie district, and from nches at Augusta in the south-west, to practically nothing in parts of far interior.

Aborigines.—The aborigines of Western Australia differ in no great ee from those of the other parts of Australia. Their origin is nown, and since they possess few traditions and no written language, likely to remain so for all time. Their dialects, habits, weapons and acteristics vary considerably. Those of finest physique are found in north, and it is thought by some that a strain of Malay blood may unt for this. Wallace's description of the natives of Australia applies to those of the western state. In height they fall but little short of European, though inferior in muscular development, the limbs often little more than bone. The cranial formation is narrow and long, high cheekbones, the lower portion of the forehead about the brows

projecting, the upper receding; the nose, narrow above, becomes br and squat further down; the ears are inclined forward, the mouth is la and unshapely, with white, well-formed teeth; the jawbone is contrac and the chin small. The complexion is dark brown, almost black, w the hair is pitch black, and sometimes inclined to curliness. Their int gence is not of a high order, though they show a certain quickness apprehension, and great imitative powers. The tribes are noma though confined to certain bounds. In no part are villages or kraals b and amongst the inland tribes even houses or huts of grass or branc are unknown. They are seen now in greatest numbers in the Kimbe district, and in the ranges from which the rivers of the west coast their rise. In the south and south-west they are rapidly decreasing number, and will soon be extinct. Small tribes are found in the inter living from hand to mouth on lizards, iguanas, and other reptiles, depe ing for their water supply on wretchedly supplied rock-holes and na wells, naked and houseless, always forced by the stern nature of country to be moving on. Kangaroo, emu, pelicans, ducks, fish, and ed plants form the food of the coastal tribes; their weapons, well suited their purposes, include the boomerang, spear, throw stick, club or waddy, and the wommera, mero, wanner, the flat board with which their spears thrown. The spears vary in size and manufact In the north they are formed of cane and bamb and tipped with delicately-chipped heads of qua opaline, or since the advent of the white man, glass, or the material of telegraph insulators. Sp with sharp and cunningly devised wooden and b barbs are used further to the south, whilst in the interior spears sharpened wooden points are found. Though to all appearances l above the beasts of the field in their mode of life, they have laws ceremonies of great mystery and import. Several missions have b established amongst them, and in some cases with good results. A g many aborigines are employed on cattle and sheep stations, where t soon learn to become useful and clever servants. Habitual cannibal does not seem to be practised, though some authenticated cases have b reported in the north-west and in the north.

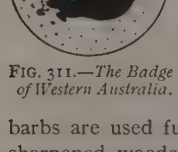

FIG. 311.—*The Badge of Western Australia.*

Colonial History.—With the landing of the emigrants from the *melia*, the history of Western Australia as a British colony begins, on 2nd of June, 1829. The first camp of settlers was known as the Swan R Settlement. Closely following the *Parmelia* and *Sulphur* a numb vessels arrived, rapidly adding to the band of pioneers, and bringing necessary live stock for colonisation. Since the time of its found the authorities and people of the colony have never given up the wo exploration, and from 1829 to 1899 no year has passed in which districts have not been opened up, new pastures or minerals fo

ether by government or private enterprise. From the seventy pas-gers of the *Parmelia* the population had grown in 1901 to the number 84,000, exclusive of coloured people. At first a Crown Colony, under ieutenant-Governor, Western Australia received Responsible Govern-nt in 1890, and became an Original State of the Commonwealth. The way system of Western Australia has made great strides. There were re than 2,000 miles of railway open in 1902. The Great Southern line nects the capital, Perth, with Albany, on King George Sound, and the tern connects the capital with Fremantle, and Kalgurli, Coolgardie, other mining towns in the interior. The Midland and Northern lines Perth to Cue. There is direct telegraphic communication with the er world through Java by a cable from Roebuck Bay in the north-t, and also by a land line in the south, through Eucla to Adelaide.

The Chief Towns.—*Perth*, the capital, is prettily situated on the an river, some ten miles from its mouth. It is the seat of Government, residence of the Governor, and contains the Houses of Parliament, nuseum, mint, botanical gardens, obser-ory, cathedral, and public parks. A seway bridge, connecting it with *South th*, crosses the Swan river, at the mouth which *Fremantle*, the chief port of the ony, is situated. It has railway, road, river communication with the capital. ensive harbour works are being carried , which will enable the mail steamers to ke this their port of call, and so shorten time of transit for mails from England. ile of advantage to the general com-nity, the completion of this harbour will deal a blow to *Albany*, on ncess Royal Harbour, in King George Sound, the present port for mail mers, the terminus of the Great Southern Railway, and a coaling station the British navy. The entrance to the harbour is defended by forts in ch a permanent force of artillery is kept, under the command of an erial officer. The junction of the railway systems at Perth makes sible a through journey of over 500 miles from Albany to *Geraldton*, on mpion Bay on the west coast (Fig. 293). This is the port for the chison district, which is rich in minerals, and for agricultural and oral purposes. Seven thousand bales of wool are annually exported. ilway connects Geraldton with *Cue*, the chief town of the Murchison -fields, nearly 300 miles inland, and in the not distant future it will be ible to travel by rail from Geraldton, through Cue, to *Menzies* and *gardie*, the capital of the gold-fields of that name. In 1892 a mere of tents, in 1891 a part of the silent bush, by 1898 Coolgardie could t its stone and brick buildings, hotels, stock exchange, churches, and ric light, railway and telegraph. It is surrounded by gold mines in

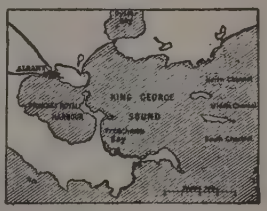

FIG. 312.—*King George Sound and Albany.*

active operation, saw-mills, brick and tile works, and other progre industries. The water supply is brought in pipes from the Coast m tains, not far from Perth, a distance of more than 300 miles. The rai from Perth passes through *Southern Cross*, for long the last outpo civilisation, and *Kalgurli*, some twenty miles beyond Coolgardie nearly 400 miles east of Perth, as far as *Menzies*. Kalgurli has ecli Coolgardie, and has become the scene of the most active gold-m operations in the colony. The most important centre for pearl fisher at *Broome*, on Roebuck Bay, on the north-west coast; the landing-p of the submarine cable from Java. The centres of farming and agricu are *York* and *Northam*, about forty miles east of Perth. Coal is obta at *Collie* in the south-west.

STATISTICS.

	1881.	1891.	1901.
Area of Western Australia in square miles	975,920	975,920	957,920
Population (excluding Aborigines)	29,708	49,782	184,124
" Perth	5,044	9,617	36,274
" Fremantle	3,641	7,077	20,444
" Coolgardie	—	—	—
" Kalgurli	—	—	—

ANNUAL TRADE OF WESTERN AUSTRALIA (*in pounds sterling*).

	1871–75.	1881–85.	1891–95.	1901.
Imports	288,000	520,000	2,011,000	6,454,000
Exports	353,000	469,000	1,036,000	8,515,000

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CHAPTER XXXIV.—NEW ZEALAND

By the Hon. W. P. Reeves,
High Commissioner for New Zealand.

Position and Extent.—The Colony of New Zealand is an archi-
igo, with a total land area of 104,471 square miles, lying in the South
ific, about 1,200 miles east-south-east of Australia, and almost entirely
ween the parallels of 34° and 47° S. Its two main islands, called North
South respectively, and a third and much smaller island, named
vart, lie close to each other. Of the other and smaller groups the
madecs, about 500 miles to the north of the main islands, the Chathams
ut the same distance to the east, and the Aucklands about 200 miles to
south are the chief. Others are the Campbell, Antipodes, and Bounty
ups, all of which are uninhabited, and, from their isolated position and
l, bleak climate, likely to remain so. The long, narrow, irregular chain
ned by the main islands is distinguished by height and variety, by an
ensive coast-line—4,330 miles—and a climate passing by degrees from
tropical to the cooler temperate. The extreme length of North Island
15 miles, and its breadth varies from 6 to 300; of South Island the
gth is 525 miles, the greatest breadth 180.

Coasts.—On the whole the coasts are high, sometimes grandly pre-
tous. Deep water is nearly always found close to the shore. The
ts are numerous, but the harbour accommodation not very conveniently
ributed. In the south-west of South Island many sounds or fjords
etrate, and are overhung by the towering ranges of the Southern
s. Their combination of mountainous grandeur and lavish vegetation
kes them at least rivals of Norway or Alaska, and as anchorages they are
easy to surpass. But they give access to nothing better than storm-
en and well-nigh uninhabitable mountains. When, north of these
ds, a more practicable country is reached there are no harbours but the
ths of bar-bound rivers. This is true also of the whole western coast
North Island, though some of its bar-harbours are very commodious
n once they are entered. The eastern side is, on the contrary, well
ided with harbours in its more northern portion. Among them
emata, the port of Auckland city, is one of the best in the southern
isphere. South of the Bay of Plenty, however, there is no such thing
good natural harbour found right down to Cook Strait. Fortunately
channel, which divides North and South Islands, and is but sixteen
s across in its narrowest part, is well furnished with havens, on one of
h, Port Nicholson, Wellington (the political capital of the colony) holds

an unrivalled commercial position with easy access by steam to both coa
of both islands. On the southern side of the strait is another series
sounds, beautiful, though not equal in magnificence to the fjords of
south-west.

Little natural shelter is afforded by the eastern coast-line of South Isla
But about half-way along the coast a large volcanic peninsula, named
Captain Cook after his friend, the distinguished naturalist, Sir Joseph Ban
juts out in picturesque hills, the highest of which is slightly over 3,000 f
in height. Several of its inlets provide excellent refuge for shipping ; one
them, Akaroa, is an admirable natural harbour, and another, Lyttelton,
been artificially made one of the most commodious in New Zealand. Furt
south Port Chalmers, a large bar-harbour of the less impracticable cl
has also been greatly improved by dredging and other works.
Foveaux Strait, by which Stewart Island is separated from South Isla
The Bluff is the port of the large district of Southland. Twenty-n
coastal lights have been erected by the colonial government, eight of
first class, fifteen of the second, three of the third, and three yet smal
This is exclusive of harbour lights. The coast is stormy, but fogs are ra

Mountains.—The most striking physical characteristic of N
Zealand is the parallel system of mountain ranges which form its ba
bone. Starting in the extreme south-west, they run north-eastward,
interrupted by Cook's Strait, but end only near East Cape, at the po
of the shoulder which forms the south-eastern corner of the Bay of Ple
They reach their greatest height near 40° S., where they are known as
Southern Alps, and there Mount Cook or Aorangi attains to 12,349 feet,
noblest of many fine peaks. In this part of the Alps there are glaci
exceeding those of Switzerland in size. On the west side some of th
descend to within a thousand feet of sea-level, and penetrate the for
zone. Further north the Alps fork, so as to reach and overlook both
east and west shores of South Island under the names of the Kaiko
and Tasman Ranges. In the former Tapuae-nuku is 9,462 feet high.

The continuation of the chain in North Island is at a lower elevati
Near its north-eastern end Hikurangi, 5,606 feet, is at once its highest a
most picturesque summit. Westward of and quite apart from the m
range three remarkable volcanoes present a striking appearance. T
of them, Ruapehu, 9,008 feet, and Tongariro are still active, and from
three craters of the latter, of which the highest is Ngauruhoe, 7,515 fe
steam and noxious vapours constantly issue. The fine cone of the thi
Egmont, 8,260 feet, slopes in solitary beauty to the western sea-shore, a
in the symmetry of its form is considered to equal its famous Japan
congener, Fujiyama. Ruapehu and Tongariro are at the south-east
end of an interesting volcanic line which is prolonged to White Isla
an insular cone in the Bay of Plenty, incessantly active and noted
its sulphur deposits. On either side of the line lies the Hot Lakes Distr
abounding in hot and warm springs and pools, geysers, solfataras,

naroles. The chemical properties of many of the thermal waters, me sulphur-acid, some sulphur-alkaline, are potent for the cure of ness, especially gout, rheumatism, skin-diseases, and disorders of the oat, liver, digestion and nerves. A number of bathing establishments d a government sanatorium are already the resort of invalids and rists.

The lakes of the islands are many: the largest, Taupo, about twenty les long, and as many broad, lies in the very centre of North Island, but the whole the most picturesque sheets of water are the deep, ribbon- e Wakatipu (54 miles long), Te Anau (132 square miles), and the angely irregular Manapouri, all found amongst the Southern Alps.

Surface of South Island.—The western half of South Island may summed up as a mountainous country, fit chiefly for miners, shepherds, d timber cutters, and in places not even for these. West of the water- ed the mountains are, as a rule, clothed with forest and drenched with a pious rainfall, which in the fjord region is as heavy as 170 inches per num. Here and there in river valleys or coastal strips are patches of able land, fertile, but usually troublesome to drain and clear. East of e watershed the ranges are for the most part bare of timber, and below e snow line carry sparse but nourishing native grasses. Here and there elevated plain is found, such as the Mackenzie or Maniototo, useful, but eak in winter. Towards the east coast, however, there are considerable acts of level or undulating country. The largest of these, the Canter- ury plains, which is about 160 miles long and 30 miles broad in its idest part, is almost a dead level. At the south end of the island ide expanses of arable land occur in the district of Southland.

Stewart Island, on the other hand, is broken and forest-clad roughout, has beautiful inlets on its eastern side, and presents a eak, bold western coast to the fierce south-westerly gales from the ntarctic. From the Kaikouras to Foveaux Strait the treeless and, on e whole, fertile character of the country rendered it easy of occupation graziers and farmers, and a belt of almost unbroken settlement of an erage breadth of 25 miles from the coast may now be found there. certain localities agriculture has ceased to be rough and primitive, d is now carried on with no small outlay of skill and capital.

Surface of North Island.—In North Island the two most valuable cts of country are those on the middle parts of the east and west coasts. the east coast the district round Hawke Bay is rolling and in part a ad level of great fertility, though rather exposed to floods. On the west st the country is more undulating, swelling in places, and in others de up of low, steep hills of a blue calcareous clay called "Papa," the l of which is exceedingly well fitted for pasture. From about thirty es to the north of the city of Wellington as far as the harbour of whia, a fertile territory extends which was formerly covered with forest, v to a large extent cleared away, and is without a superior in the

colony for dairy farming and for some kinds of sheep. Another use piece of country is the central plain of the Wairarapa lying betwe mountains in the southern part of the island. The Hot Lakes District however, for the most part covered with pumice-sand too porous to ca grass well. The Onetapu and Waingaroa Plains there, at a mean elevati of about 2,000 feet above sea-level, seem empty and desolate. Furth north the soil of a large portion of the province of Auckland is made of stiff white or yellow clay, fertile only after assiduous tilling. Here a there, however, this is relieved by strips and patches of alluvium of gr fertility, and some of considerable extent.

Rivers.—Throughout the islands it is scarcely possible to travel m than two or three miles anywhere without encountering a river or stre of greater or less size. Nearly all are perennial, and the volume of wa discharged into the sea by some of them is surprisingly great in proport to their length. But the narrow, eleva nature of the country gives most of rivers the character of mountain torrent swift, cold, liable to sudden floods, and but little use for navigation. Among exceptions to this, however, is the long river in the colony, the Waikato, wh flows northward from Lake Taupo. It traversed by river steamers for a gr part of its course. Several of the west rivers of North Island, notably the W ganui, flow between high cliffs thic clothed with vegetation of remarka richness and beauty. Many of the riv of South Island wander about beds shingle, sometimes miles in breadth, a constantly change their swift and shall courses in a fashion costly and puzzling to road-makers and brid builders.

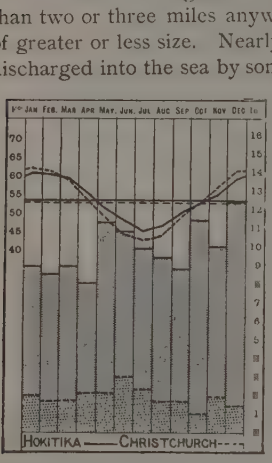

FIG 313.—*Temperature and Rainfall of Hokitika and Christchurch.*

Climate.—Though singularly healthy and on the whole agreeable, climate of New Zealand is distinctly warmer than even the southern p of Great Britain. The average temperature of the air in South Island is and in North Island 7° higher than that of London. It is, however, m equable. The variation between the extremes of daily temperature is only, and the average difference between the mean of the warmest and coldest month is 5° less than in Jersey. Except on the saturated and alm uninhabited south-west coast, almost the only serious climatic drawbac wind. The narrow mountainous islands lie in the "roaring forties," a the gales in Cook and Foveaux Straits, and in the neighbourhood of so of the alpine gorges are frequent and severe. The average annual rain in the more important centres of settlement is. at Auckland 42 inches,

Wellington 50, at Christchurch 26, at Dunedin 36. At Hokitika on the west coast of South Island it is 120 (Fig. 313).

Flora.—The flora of New Zealand is striking, varied and beautiful. Nearly half the colony, including almost the whole west coast, was until recently clothed with dense forest. The eastern half of the islands except in the far north and the extreme south-east corner, is usually open and covered with wiry indigenous grasses, or in the swamps with the tall *Phormium tenax*, or native flax. The forest trees are evergreens, and the larger, mostly pines (which, however, bear little resemblance to the pines of Europe) and small-leaved beeches. In the northern half of North Island, the huge kauri pine, often from eight to twelve feet in diameter, yields a fine timber, as well as the resin or kauri gum of commerce. Lianas, flowering creepers, the palm (the *nikau*), and a palm-like lily, add to the beauty of the forest, but to botanists the most engrossing division of the New Zealand flora is the ferns of which there are scores of species, mostly peculiar to the islands. Tree ferns as high as sixty feet are met with. In the more closely settled districts, imported willows, poplars, Australian eucalpytus, and Californian pines make up the plantations. All English flowers and fruits, and, in North Island, oranges and lemons, are cultivated. Some ten million acres are sown with English grasses.

Fauna.—Animal life in New Zealand, before colonisation, was remarkable for the paucity of land mammals and reptiles. A rat with round ears like a mouse, a smallish dog, and two kinds of bats alone represented the mammals, and of these the dog is now extinct, and the rat rarely seen. Lizards were the only reptiles, and a small and not widely distributed frog the sole amphibian. The native birds are numerous and interesting, especially in the forests. Several, notably the *tui* and the *mako mako*, sing very sweetly. The islands were formerly the home of the gigantic wingless *moa*, whose skeletons are now prominent in museums. Wingless birds still live in the shape of the *kiwi* and *takehé*, the latter extremely rare. The *weka*, called wood-hen from its likeness to the domestic fowl, has rudimentary tufts of feathers in place of wings, and the *kakapo*, or ground-parrot, has wings but cannot fly. No large fresh-water fish are indigenous though eels were common and sometimes grew to a great size.

All English domestic animals have been introduced by the colonists, and have thriven; this is true also of such English birds as the skylark, blackbird, starling, house-sparrow, and goldfinch, and certain game-birds, notably the pheasant. Pigs introduced by Captain Cook have run wild, and afford sport, as do red and fallow deer, hares and rabbits. Rabbits are now a serious plague, though stoats, weasels and ferrets have been imported to prey upon them. Trout have been acclimatised, but not salmon, despite many attempts. Sea fish are fairly plentiful; the snapper, flounders, and a kind of whitebait are especially good eating.

People and History.—When discovered by Europeans the islands were sparsely peopled by the Maori, a brown Polynesian race which had

colonised them some five or six hundred years before. They were int gent and physically active, tall, and well-built, good canoemen, fisherm and tillers of the soil. They showed considerable skill in wood-carv but had no knowledge of writing, metals, or pottery. They were feroci cannibals, constantly engaged in tribal wars. Their religion was a ya polytheism, and their government a rule of priests and chiefs enfor largely by the famous *tapu* (taboo). The first European to encounter th was the Dutch sea-captain, Tasman, who lighted upon the islands December, 1642, but did not land. Not recognising their insular charac he gave them the name of Staaten Land, which was afterwards change New Zealand. Not until 1769 were they again visited, but then Captain C circumnavigated them in successive voyages, and mapped out their co with great care and accuracy. He took possession of them, but the Bri government repudiated his action, and for seventy years the country mained a No Man's Land. Early in the nineteenth century it became haunt of whalers, sealers, and traders in timber, flax, native weapons mantles, and tattooed heads. Samuel Marsden, Anglican chaplain in N South Wales, established a mission there in 1

FIG. 314.—*Badge of New Zealand.*

Some years later the Maori began to obtain musk and powder, and in twenty years a fourth of their n perished in war. After about 1825 the missiona began to make numerous converts, and by 1838 wars died away. The growing number of white venturers, however, domiciled in the country, and th enormous land claims made some sort of settled gove ment necessary. The French decided to annex islands, but they were anticipated by the New Zealand Company, English colonising association, founded by Edward Gibbon Wakefi This Company forced the Colonial Office to take possession of N Zealand by despatching emigrants thither, who reached Wellington January 29, 1840. A week earlier, however, Captain Hobson landed in the Bay of Islands, with a dormant commission in his poc authorising him to annex the country. This he did after enter into a treaty with the principal native chiefs, 512 of whom signed The British flag was hoisted in South Island in July of the same y only a few days before the arrival there of a French frigate sent to t it. Until 1853 the colony was personally ruled by Governors. Parliament government was not fully established until 1856. After various modifi tions it has taken the form of a bicameral system, under which memb of the Upper House are nominated for seven years, and those of the Lo elected for three under a universal franchise possessed and freely used women as well as men. The British Viceroy has the right of dissoluti and may—and occasionally does—reserve laws for the consideration the Imperial government. Foreign affairs are expressly and currency virtually excluded from the purview of the parliament.

The settlement of the colony was pushed not from one centre but om nine or ten different points on the coasts. Hence arose a rong local feeling which still exists. The colonists e almost entirely British—English, Scots and Irish order of strength. A small German and Scandi- avian element is now almost absorbed. Chinese migration is checked by a £50 landing-tax, and the hinese have diminished from eight thousand to three ousand. The Maoris, who, after more than one stinate war with the settlers have been at peace r nearly a generation, are still slowly declining, ough half-castes increase. The birth-rate amongst e whites falls steadily but the death-rate is the lowest in the world. As numerical strength the religious bodies rank thus: the Church of ngland, Presbyterian, Wesleyan and Methodist, Roman Catholic. Edu- tion is free, secular and compulsory. There are good secondary schools, d a university with five colleges.

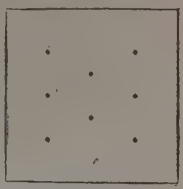

FIG. 315.—*Average population of a square mile of New Zealand.*

Industry and Trade.—The chief occupation of the people is the azing of sheep and cattle, and certain industries cognate thereto, ch as cheese and butter making, the freezing of mutton and beef for port, wool-scouring, bone-crushing, tanning, and the manufacture of oots and shoes, and woollen stuffs. The best frozen mutton imported into Great Britain comes from New Zealand. Agriculture comes next to grazing, and gold and coal mining follow agriculture. Timber-cutting and kauri gum digging are of importance. Brick and tile making, furniture making, iron founding and machine making, flax-dressing, printing, jam making and brewing are other industries. Distilling is prohibited by law. Most manufactures are more or less protected by customs duties, often as high as 20 and 25 per cent. *ad valorem*. Butter and cheese are of excellent quality, and are made in factories on the Danish system for export to Great Britain. Three-fourths of the trade of the colony is with the mother country, and nearly all the rest thin the British Empire—with Australia, India and Fiji. The colony is ll provided with State-owned railways, telegraphs and telephones.

316.—*The Railways of New Zealand*, 1899.

The four chief ports are fortified with batteries and torpedoes. case of war about eight thousand fairly efficient volunteers could be imr diately mustered. A British warship, towards the cost of which the colc contributes, is stationed in New Zealand waters.

Towns.—For many years New Zealand was divided into provinc Though these were legally abolished in 1876, the names of the Provinc Districts are still used for the sake of convenience, and the coloni commonly speak of them. They are Auckland, Taranaki, Hawkes B Wellington, Nelson, Marlborough, Cant bury, Westland, Otago, Southland. T four principal towns are Auckland, Chri church, Dunedin and Wellington. *Auckla* is the most attractive to the eye, and its f harbour is important for trade. *Wellingt* though still the smallest, is the capital, a is overtaking the others in population. U like the others, which are by the sea, *Chr church* stands inland on the Canterbu Plain. All the towns are railway termi *Dunedin* is the centre of the Presbyterian Church, Christchurch of t Anglican. All are fairly well paved, and lighted with gas or by electrici and are provided with churches, theatres, halls, and recreation groun Most of the buildings are of wood. The rather mean architecture pleasantly redeemed by the trees and gardens in which most of t residences stand. The towns are well drained and healthy. The hou of labour seldom exceed eight and a half a day, with a weekly half-holid Football is the favourite athletic sport, and horse-racing very popular.

FIG. 317.—*Auckland Harbour.*

STATISTICS.

Area of New Zealand (square miles)	104,471
North Island	44,468
South Island	58,525
Stewart Island	665
Chatham Islands	375
Other Islands	438
Number of acres under cultivation (1898)	11,483,127

	1881.	1891.	1901.
Population	530,000	688,651	815,862
Density of population per square mile	5	6	8

POPULATION OF TOWNS.

	1891.	1901.		1891.	1901.
Auckland (with suburbs)	51,207	67,226	Christchurch (with suburbs)	47,846	57,041
Wellington " "	34,190	49,344	Dunedin " "	45,869	52,390

ANNUAL TRADE OF NEW ZEALAND (*in pounds sterling*).

	1871–75.	1881–85.	1891–95.
Imports	6,323,000	7,837,000	6,579,000
Exports	5,324,000	6,745,000	9,229,000

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CHAPTER XXXV.—MELANESIA

Position.—The great island of New Guinea, or Papua, occupies an rmediate position between the continent of Australia and the Malay hipelago ; but the character of its fauna and flora shows clearly that it ongs to Australasia. The aboriginal people, on the other hand, are dis- t from those of both the great regions to north and south, but show ities with the Melanesians who inhabit the chain of oceanic islands ediately to the east. New Caledonia, coming half-way between New nea and New Zealand, may also be considered as a Melanesian island.

I.—BRITISH NEW GUINEA

By Sir William Macgregor, G.C.M.G., C.B., M.D.,
Formerly Lieutenant-Governor of British New Guinea.

Position and Surface.—The colony of British New Guinea, formally exed in 1888, occupies the south-east of New Guinea and a number of ll islands. The total area of colony is about 90,500 square es, of which 2,700 square miles resent the small islands. With exception of the low coral nds of Kiriwina, Nada, part Murua, and a few others of ll dimensions, the islands are ntainous and principally of istose formation ; the highest, denough, rises to 8,000 feet. eastern end of the main- l part of the colony is also mountainous, and as the mountains end westward they rise and coalesce to form a massive central chain, ch attains its greatest altitudes in the Owen Stanley Range, the hest point of which is Mount Victoria, 13,200 feet, and in Mount atchley, the Wharton Range, and Mount Albert Edward (about 00 feet). Further west the range becomes more broken and lower, le pursuing nearly the same general trend towards the north-west. e western end of the colony is for nearly 300 miles generally low and mpy for a long distance inland. The mountains near the east end, on mainland, are of igneous origin ; the great masses of the central part of main range are all schistose, while in the west sandstone predominates, there are outcrops of igneous rocks such as Mount Yule (about 10,000). On the Fly river near the point of junction of British, Dutch, and

Fig. 318.—*New Guinea.*

German territory, and in other low grounds in the west, there are limes with fossil corals. The whole possession is remarkably well wate the mountains and most of the lower country are covered by fore

Rivers.—Most of the principal rivers converge upon and enter the of Papua. The head streams of the Fly, the largest river in the is spread over a large area in the centre of the island, its basin b shared by the three different territories. Its course is about 620 from the sea to the British-German boundary. The influence of the is felt over a hundred miles up the Fly; and it is navigable by a s launch for over 500 miles. The Purari river is navigable by steame 120 miles. The Mambare, the chief river of the north-east coas navigable for about fifty miles.

Climate and Natural Resources.—As the colony lies bet 5° S. and 11½° S. lat., the climate of the lower part of the country is w It is outside the range of the hurricanes that pervade the southern pa the western Pacific. At Port Moresby, near the middle of the colony average temperature at 9 a.m. for three years ending 1897 was 81° F. extreme range of temperature was from 94° to 74° F. at 9 a.m. The season is from November to May, hottest in January and February; the season is from June to October, coolest in August. During the hot se unsteady north and north-west winds blow on the south coast; during cold season they are from the south-east and are much more regular. Port Moresby the rainfall of three years averaged 37 inches, at Daru in western division 82·5 inches, while at Samarai near the south-east en the mainland it was 126·5 inches in one year. It is much greater undetermined, on the central mountain ranges. The climate is gene agreeable at an altitude of 3,000 feet, a height that can be reached in day from Port Moresby. At 5,000 to 6,000 feet it becomes distinctly at night, the thermometer sometimes reading 55° F., and at 10,000 fee is met with in the early morning. Malarial fever, of a type that is rule comparatively mild, is not rare on the low grounds. The obst scaly ring-worm common in many parts of the Pacific exists, and rhe tism is not unknown; but many of the infectious diseases of Europe never been introduced. The climate is favourable to the cultivation tropical products, including rice and maize.

Flora and Fauna.—The flora is as varied as the climate. On tops of the highest mountain chains there are many species of gra buttercups, forget-me-nots, daisies, rhododendrons and heaths. The f there is principally cypress; from 7,000 to 10,000 feet it is chiefly m ceous, often covered by trailing bamboo or mixed with pandanus; from 2,000 to 5,000 feet evergreen oaks are common. Native clo made by beating out the bark of the paper mulberry and other t Fibre is obtained from the banana, the coco-nut and the aerial roo certain species of pandanus. There are no dangerous carnivora in colony, although wild swine are common. There are several varieti

aby, phalanger and echidna; and no deer, hares or rabbits. The dangerous creature is the crocodile, which causes considerable loss fe, and there are poisonous snakes nearly related to those of Australia. birds include the cassowary, many Birds of Paradise, pigeons, the bill, cockatoos, geese, ducks, quail, and on the mountain tops, snipe woodcock.

People.—All the native tribes of the colony that have up to now been with seem to belong to the same race; they present, however, well ked differences in physical appearance, disposition, language and oms. No clear trace of an old or earlier race than the existing one has discovered. The present inhabitants doubtless arrived in the country n it was already covered by dense forest, which had its effect in rating them into secluded, shy and suspicious communities. Differ- s in the nature of the food and of the water also help to differentiate people. Some live almost exclusively on sago, others on yams and some on bananas, others principally on sweet potatoes. Many tribes continuously in a heavy, moist, warm atmosphere near the coast line; rs in the light and bracing climate of the mountains. The average of a Papuan is less than that of an average European. The race affini- with the Pacific are strong; and on the coast line there is a smooth- ed Malay-like element that is absent in the interior. There is a well ked relationship to the languages of Polynesia, but the isolation of the rent communities has led to such diversities of dialect that people g only a few miles apart cannot understand each other. The dialects easy to acquire, containing few or no sounds that cannot be represented he English alphabet, or be easily pronounced by an English-speaking on. English is now making considerable progress. The European ulation is about 500; the native population is estimated at about 350,000. re has been, however, no native census.

Government.—The possession has the constitution of a Crown Colony, the cost of administration is chiefly defrayed by Commonwealth of Australia, the exact relation of ch to the Government of New Guinea was not de- d up to 1903. There was no form of government ng the native population. A certain measure of fly influence is being created now by a few men er government authority, but control over the ves is best acquired by the gradual creation of a e of village policemen. The administration has at disposal an armed constabulary consisting of over a hundred natives lled from many different districts. There is a local Legislature nomi- d by the Crown, and consisting, with one exception, of officers of the ernment.

FIG. 319.—*The Badge of British New Guinea.*

Trade.—The chief industry worked by Europeans is alluvial gold ing; the number of miners has varied at different times from 100 to

800 men. The gold-bearing country is extensive, but very difficul prospect. There are indications of auriferous reefs. The valuable mi osmiridium has been found from the Gira river to the Owen Stanley Ra and coal exists in the Purari sandstone district. The pearl and pearl- fishery is of considerable importance, the shell being widely distrib over the eastern seas of the colony. Bêche-de-mer is found on most o reefs, and turtle shell is common. Sandal-wood is sometimes found i form of large trees, so far only in the central district on the mainland, is exported. The rubber industry is important and promising; the i genous trees alone yield this article at present, but both soil and cli should be favourable to the better sorts of foreign rubber trees. T are some good varieties of timber, including cedar and ebony. There be no reasonable doubt that the sugar-cane, which is native and pre in a great many varieties, sago, cotton probably also indigenous, co tea, vanilla and tobacco, which is domesticated if not actually indige and of exceptionally fine quality, will eventually be very valuable. The ternal trade of the colony is chiefly with Queensland and New South Wa it amounts to about £130,000 annually. The tariff is comparatively lig

A steamer runs regularly to the possession, starting from Sydney calling at Port Moresby and Samarai, and proceeding to the Solo Islands and thence back to Sydney. Much of the internal commun tion will be carried on by the rivers. Tracks have been cut right ac the colony from north to south and in many other directions, and natives are becoming accustomed to travel alone or with Europeans great distances; but there are few roads.

Political Divisions and Towns.—The colony is divided into magisterial divisions, in each of which there is a Resident Magistr The Central Court, which possesses the jurisdiction of an ordinary Supr Court, sits wherever there is occasion. The principal seat of Governm is at *Port Moresby*, which is centrally and picturesquely situated o large and sheltered harbour, easy of approach and provided with stantial wharves. The population consists of about 1,000 natives some 40 Europeans. The immediate neighbourhood is not suited ordinary cultivation on account of the rather scanty rainfall. *Sama* the most important place, is situated on an islet lying about a m from the mainland in the east. It is the headquarters of Resident Magistrate of the district, and the European population generally greater than at Port Moresby; there is no native village. third port of entry for the colony is the island of *Daru*, the headquar of the Resident Magistrate for the western division. It has a good safe harbour, the only one the colony possesses in the west, and is vis by many boats engaged in the pearl-shell fishery of Torres Straits.

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II.—GERMAN NEW GUINEA

By Graf von Pfeil.

Position and Surface.—The coast of Kaiser Wilhelmsland, or
man New Guinea, on the north-east of the island, runs nearly in a
ght line from north-west to south-east for 600 miles. Two inden-
ns, Astrolabe Bay and Huon Gulf, flank a peninsula on which rise the
sterre and Rawlinson mountain ranges. Beyond this promontory no
phological development is noticeable along the coast, which yet has
mber of good harbours formed by coral reefs bordering it. There
besides some good roadsteads sheltered by small coral islands and
v bays cut into marshy lowlands. So far no mouth of the numerous
s of New Guinea has been found available as a harbour. The navi-
e rivers offer no building sites near their outlets, the banks of their
r course being mostly marshy plains suitable for rice-growing; those
s which are not navigable have mostly too small an entrance from the
to render them suitable. The Ramu has been found to be navigable,
when the Margaret river is explored, it is justly surmised that it also
prove navigable. The Kaiserin Augusta river has been ascended with
-going steamer for 180 miles. All the rivers carry a surprisingly large
ntity of water, a circumstance no doubt due to the great elevation of
mountains which crowd this huge island, the interior of which is as
almost unknown. The few expeditions that have ventured to open
he country found progress exceedingly difficult. There are no paths,
erritory is terribly rugged, and covered with so dense an undergrowth
hrub that a road must be cleared with hatchets; a day's toilsome
ch may result in the advance of one mile. On the steep hillsides
r is not always met with, so that expeditions suffer from thirst. From
sea, chains of tall mountains may be discerned far inland. Above all
r the two loftiest peaks of the Bismarck Range, Mounts Wilhelm
Herbert, exceeding 13,000 feet. It seems probable that these mountains
n a continuation of those in Dutch New Guinea, on which, it is re-
ed, snow has been observed, and that they lead on to the Owen
ley Range, thus forming a central backbone. Of the geological
racter of these mountains absolutely nothing is known. In Huon
the rivers bring down pebbles derived from ancient volcanic
s, while north-west of the peninsula mentioned above more recent
nations seems to prevail. A zone of coral rock forms the coast for
e distance north-west of the peninsula and rises in a number of peculiar
very striking terraces to a great height. As far as can be ascertained
coral zone does not extend more than a few miles inland.

Climate, Flora and Fauna.—The climate is hot and moist, the
ly rainfall being very considerable, though subject to great variations;
ference of 79 inches has been observed. The seasons are not clearly

defined and there is no strictly rainy or dry season, but rain fal
nearly every month of the year. A very remarkable local influenc
the distribution of the seasons seems to be exercised by the Finis
Mountains; when the greater rainfall takes place east of them,
western part enjoys a dry season, and *vice versâ*. Heat, moisture and a
soil combine to produce a most luxuriant vegetation. The whole co
is covered with dense dank forest, the upper boundary of which ha
yet been ascertained. Timber and a great variety of wood, valuabl
cabinet makers' purposes, is plentiful, but difficult to obtain on accou
the rugged character of the country. Banyan trees of gigantic size,
labyrinths of aerial roots, are frequently met with, the mango is f
wild, huge tree-ferns delight the eye, and tangled lianas render pro
next to impossible. Orchids of rare colour and shape are often fo
and there is no doubt that the nutmeg also exists. The few plains kn
in New Guinea near Hatzfeldhafen and on the banks of the Kai
Augusta river, and also the coral terraces, are covered with tall
instead of the customary forest. The fauna, very poor in quadru
has only a few marsupials—among them the wallaby—and rodents
the many varieties of the Bird of Paradise which are found are
most beautiful birds in the world, and only the large specimens of bu
flies the country produces can vie with them in the splendour of
colouring. The cassowary has been met with, and the tufted piged
large as a goose is well known. Snakes are not very numerous, th
mostly venomous. Large crocodiles are sometimes found in the river

The Bismarck Archipelago, containing New Britain and
Ireland, forms a part of this South Sea colony, and is a name g
to several groups of islands, of which the Solomons are one. Of t
only the three largest belong to the archipelago. The only well-expl
districts are the Gazelle Peninsula, which forms the northern part of
Britain (Neu Pommern), and the small islets of the Duke of
(Lauenburg) group. On the small coral islands some of the tra
firms have their establishments; on the Gazelle Peninsula several pl
tions are carried on successfully. The soil is a rich loam forme
volcanic ashes, which spread over a large area after they had
ejected by the three now extinct volcanoes, which are the distinguis
features of this peninsula. New Britain offers greater facilitie
European settlers than any of the other islands of the archipelago.
coast-line is well indented with numerous bays, the mountains w
fill the interior seem to be less precipitous, the valleys between t
wider and easier of access than those of New Guinea. The
islands, though all of considerable size, are almost unapproachable,
coasts are steep and unbroken, and man is almost wilder than na
Confirmed cannibals, the natives are nearly all very warlike, and
strenuous opposition to all attempts at European ingress. Some isl
have suffered from the Australian labour traffic. The natives in

ipelago differ considerably from each other, according to the island h they inhabit. Three types can clearly be distinguished. The le of New Britain, of New Ireland (Neu Mecklenburg), and those e Solomon Islands, who again divide into a darker and a lighter type. gain differ from the inhabitants of New Guinea, who are physically ior. It seems probable that we have to deal with two races, a darker a lighter one. In every small district a separate dialect is spoken, and r as we know the people have no traditions which might point out history. The islands of the archipelago are covered with primeval t of a different character from that in New Guinea. The bread-fruit is found on the coral islands, almost all of which are fringed with a d belt of coco-nut palms. The sago palm is common, timber less iful, the mango apparently wanting. Birds of Paradise are not found; atoos and several species of parrots are plentiful. Pigeons are found mmense flights, but certain kinds only inhabit certain islands. The called flying-foxes, occur in thousands, and are eaten by the natives. interior of these islands is probably the least known corner of the e world.

Government. — The colony is directly administered by the erial German Government; but the develop- of its resources remains in the hands of the nan New Guinea Company. *Friedrich Wil-shafen*, the best natural harbour in New ea, has developed into a permanent settle- As this bay gives access to wide fertile s there is no doubt that the settlement on its er has a future. Other ports of some promise *Berlinhafen*, *Konstantinhafen* and *Finschhafen*.

FIG. 320.—*Flag of the German New Guinea Company.*

n the Bismarck Archipelago the chief settlements are Matupi, a small d in Blanche Bay, entirely occupied by the establishment of a essful trading firm. *Ralum* is a flourishing and steadily growing ation, and *Herbertshöhe* is the seat of administration. All those ities are situated on the Gazelle peninsula, which is the centre of c. All other settlements are trading or missionary stations at which w Europeans live in comparative solitude. Gold occurs in the arck Range of New Guinea, but plantation products and mother-of- are the chief exports.

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III.—DUTCH NEW GUINEA

By Dr. C. M. Kan,[1]
Professor of Geography in the University of Amsterdam.

Position and Exploration.—The western or Dutch half of Guinea extends from about twenty miles south of the equator to 9° S., from longitudes 131° to 141° E. It is larger than British and German Guinea taken together. The voyages of the Dutch to New Guinea in early days of the Dutch East India Company, undertaken by Wi Yansz, Carstensz, Pool, Tasman, Vink, and others, were limited to ticular parts of the coast, such as Telokh Berau, and Onin. Torres S was long unknown, and the north coast of New Guinea was sought for n of the equator, the whole being looked upon as part of the great hypothe southern continent. The explorers of the nineteenth century have outl the coast and made preliminary surveys which allow it to be represe on maps with some approach to accuracy. Subsequently mission sta were established in Dorei and Geelvink Bay, and traders came Banda, Ternate, and Celebes, while occasional visits of men-of-wa tended the knowledge of the coast. Since 1858, several scientific trave have visited the island, chief amongst them being Wallace, Bernstein, M Van Rosenberg, D'Albertis, Maklukho Maklay, Braam Morris, De Cl and Horst. The interior still remains entirely unknown.

Surface.—The south coast may be divided into two parts, lying pectively west and east of Cape Buru, opposite Geelvink Bay. The we half is best known on account of the repeated surveys and thorough st of Versteeg and De Clercq, and is characterised by off-lying islands, three deep bays named MacCluer Gulf, Arguni and Etna Bays. A small rivers, including the almost unknown Karufa, enter on this part o coast, and a steep line of cliffs about fifty feet high, composed of coral l stone, sandstone and flints, commences in the neighbourhood of the Sebekar Bay, and is repeated further east between Arguni Bay and Buru. The other half of the south coast is still very little known; fo most part it seems to be low with no deep bays, and is dangerous for gation, and very difficult of approach even off the mouths of the ri On the north coast the eastern half from Humboldt Bay to Geelvink B characterised by numerous small inlets, while the rivers, on account o proximity of the coast mountains, are but little developed. The important stream is the Amberno river, which flows from the Van mountains in the far interior. In the western half the great incur Geelvink Bay contains a number of large and small islands, the lar including Japen Island, extending in a double chain across the mouth o bay, and further west the land has the form of a flat coastal plain ba by mountains which give rise to numerous small rivers. The only pa

[1] Translated from the German by the Editor.

coast that is fairly well known is that in the neighbourhood of Dorei Andai and where Meyer crossed the island opposite MacCluer Gulf. The mountains and rivers are very imperfectly known. East of Arguni , a range with an elevation of about 3,000 feet runs from Mount Genoffa ut 5,000 feet) in a north-easterly direction. Further east, in the interior, long range of the Charles Louis mountains has been seen from the t running west and east between the meridians of 135° and 138° E. They into plateau-like summits much higher than the coast range, and are covered with clouds. The height, as measured from passing ships, ears to reach 12,000 and even 16,000 feet, but it is still uncertain ther they rise above the snow-line as has been reported. The coast ntains appear to be formed of a Tertiary limestone, and from the ence of the pebbles in the river beds, the great mountains of the rior consist mainly of slates and sandstone with some volcanic rocks. the north coast the Cyclops mountains (about 7,000 feet), near the ly discovered Santani Lake, are perhaps of volcanic origin. On unt of the insuperable difficulties of the cataracts of the Amberno river Van Rees mountains remain entirely unknown. Further west the edge e central plateau approaches the coast. Along Geelvink Bay and in the k mountains (about 10,000 feet), some great heights and isolated peaks ır, but they are scarcely known. Only the mouths of the rivers can be down on the maps ; the breadth and depth of the mouth of the Oetanata ears to indicate that it is a river of some length. We are absolutely rant as to the connection, if any exists, between the mountains of ch New Guinea and the east of the island.

Climate, Flora and Fauna.—The central mountain chain acts not as a watershed, but as a climatic boundary. The north coast, with a fall of about seventy inches per annum, receives most rain during the h-west monsoon, from November to April, the dry season lasting from to September at the utmost. The seasons on the south coast are rsed, the rainy season occurring between July and September, during south-east monsoon. The climate of the south coast is influenced by proximity of the Australian continent, the direction of the coast line, the latitude. The temperature is high at all times of the year, the age being 79° F., and the range is small. The natural vegetation of ieval forest, palms, lianas, acacias, &c., is transitional between the flora ie Malay Archipelago and that of Australia. The cultivated plants are sugar-cane, maize, yams, bananas, bread-fruit, and the Massoi tree ch supplies spices, medicine, and dyes. Amongst the land animals the t characteristic are the marsupials, including a tree-kangaroo, and ngst birds the Bird of Paradise is pre-eminent ; indeed, out of eighteen ies recognised by Wallace, no less than fourteen, including the most nificent in plumage, belong to New Guinea and the neighbouring ds. The green pigeon and emu are also found. The trepang or ie-de-mer occurs in about twenty varieties in the water off the coast

People and Government.—The population is small. The abori are Papuans mixed with Malays, as they are mixed with Polynesia the east. The Mountain-Papuans, sometimes called *Alfurs*, are dis from the coast-dwellers, and from the inhabitants of the more eastern of the possession, who are well known for their savagery and cruelty.

On August 24, 1828, the western half of New Guinea, over which Sultan of Tidore claimed a certain jurisdiction, was placed under Dutch tection by proclamation, and the post of Merkusoord was established with Fort Dubus (which was given up in 1838), and in 1848 the bound and the relations with the Sultan were revised. The occupation is pr cally limited to the occasional visits of Dutch war-vessels to the coas the prevention of intertribal war, and the protection of the few tra and missionary stations. Quite recently a post has been established u a Dutch official (*Controleur*). There are trading and mission statio *Sorong* on the west coast opposite Salawati, *Sekar*, *Skroë* on or MacCluer Gulf, and *Sileraki* near the eastern boundary. On the coast *Dorei*, and *Mansinam* in the north-west of Geelvink Bay are mi stations, while *Roon* and *Ansoes* on the island of Japen are trading p All these stations are regular calling places of the trading vessels whic along the coast as far as Humboldt Bay.

STATISTICS *(Estimates)*.

Area of Dutch New Guinea in square miles..	151,800
Population „ „ (rough estimate)	200,000

STANDARD BOOKS.

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IV.—NEW CALEDONIA

By Professor Augustin Bernard,[1]
Algiers.

Position and Configuration.—New Caledonia (*Nouvelle donie*) is almost equally distant from Aust (900 miles east) and from New Zealand miles north-west), and New Guinea (1,100 m south-east). Its form is that of an elong ellipse, lying north-west and south-east, wi length of about 250 miles and a breadth of 25 to 30. It is prolonged on the north by Belep Islands and on the south by the Isl Pines. Archæan rocks occupy the north-east; Triassic and Cretac strata form a narrow band along the west coast, and eruptive r

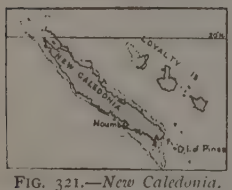

FIG. 321.—*New Caledonia.*

[1] Translated from the French by the Editor.

cipally Serpentine, are greatly developed, covering two-thirds of sland. The surface is essentially mountainous, as, although of no t height (Mont Panié, 5,400 feet, and Mont Humboldt, 5,360 feet, are ighest summits), the slopes are steep and the country very broken, cularly in the north where two mountain ridges frame the valley of Diahot, the only important river. Every variety of coral reef is found g the coast; the great barrier reef, which is second only to that of ralia, surrounds the east and west coasts and is continued to the north nore than 150 miles from the land. The chain of the Loyalty Islands a, Lifu and Mare) is formed entirely of masses of dead coral, and lies llel to New Caledonia, separated by a channel 50 miles wide.

Climate and Vegetation.—The climate of New Caledonia is acterised by a rainy season in summer (December to May), and a paratively dry and cool season for the rest of the year; but the seasons ot very sharply separated, and no month is absolutely rainless. The age rainfall at Noumea, in the south, is 45 inches per annum, which is than that of most of the Pacific islands. The vegetation, like the ate, resembles in part that of Australia and in part that of the New rides. Bush, analogous to the Australian scrub, covers at least half of island; the rest is occupied by grassy pastures and by the niaouli *aleuca leucadendron*), the most characteristic tree of New Caledonia, h takes the same place in its vegetation as the eucalyptus in that of ralia. Although the island lies wholly in the tropics, tropical forests e strict sense of the word occupy only a small area.

People.—The basis of the population of the archipelago is a woolly-ed dolichocephalic Melanesian race, to which a small proportion of ocephalic light-complexioned Polynesians with almost straight hair has recently added. As in all the Pacific Islands these natives, called *kas*, are rapidly diminishing in number.

New Caledonia was discovered by Cook in 1774, and was annexed by French in 1853. Although acclimatisation is easy for Europeans there as yet scarcely 8,000 free colonists, leaving the military guards and the ials out of account, of which the half live in Noumea and its neigh-hood. The slow rate of progress is due to the transportation system, h has produced only bad results; the public works carried out by the icts are insignificant, the concessions of land which have been made hem have scarcely succeeded, and the liberated prisoners infest the ntry. Now, however, the situation tends to improve; successful efforts been made to attract free cultivators and to reduce the number of icts, from whose presence there is reason to hope the island may soon ntirely relieved.

Resources and Trade.—The principal vegetable produce of the d is coffee, which succeeds well, and the area of the plantations is g extended. Sugar-cane, tobacco, vanilla, pine-apples, bananas, maize, manioc, are also cultivated. Stock-rearing, not however carried on

in the Australian manner on account of the limited area of the past forest produce, and fisheries all have a certain importance.

The mineral resources of New Caledonia are particularly rich; gold copper occur amongst the primitive rocks, mines of iron, chrom cobalt and nickel are worked in the serpentines, and coal occurs in Cretaceous strata. Hitherto nickel-ore only has been largely worked, this industry has undergone frequent crises on account of the lowerin the price by the competition of other producing countries, especial Canada. The condition of the industry will be improved by the erec on the spot of reducing furnaces which will diminish the weight o cargoes by about 92 per cent. and increase their value. As yet ther few roads, but the means of transport are improving. A service of steamers connects the capital with various points on the east and coasts. Monthly steamers of the Messageries Maritimes run betv Noumea and Marseilles, calling at Sydney and Melbourne, and make passage in 38 days. A submarine cable also unites New Caledonia Australia and the rest of the world. *Noumea*, the capital, has an exce harbour sheltered by the island of Nou and the peninsula of Ducos. future prospects of New Caledonia are good on account of its wealt coffee and nickel, and the prospect of free colonisation taking the pla the present convict system.

STATISTICS.

Area of New Caledonia and Loyalty Islands (square miles)	7,150
Population " " "	52,000
Density of population per square mile	7
Population of Noumea	4,600

ANNUAL TRADE *(in pounds sterling)*.

	Average 1871–75.	1881–85.	1891–95.
Exports	32,000	200,000	280,000
Imports	360,000	320,000	480,000

STANDARD BOOKS.

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V.—SMALLER MELANESIAN ISLANDS

By the Editor.[1]

New Hebrides.—The New Hebrides, including the Banks Torres groups, stretch north-west and south-east for about 480 between 13° and 20½° S. Some of the islands are of coral, and othe volcanic formation, mountainous and extremely fertile. The bread coco-nut, banana, sago-palm, sugar-cane, nutmeg and other tropical

[1] Assisted by E. J. Hastings.

ons flourish. Fish, pearl-shells, bêche-de-mer, and tortoise-shell are ned on the coasts. The natives are mainly of the Papuan or Mela- n race, but Polynesians are found on some of the islands, and many rent languages are spoken in the group. Most of the people are heathen, and cannibalism is not yet extinct. The islands were dis- red in 1606 by Quiros, and explored in 1774 by Captain Cook. ritu Santo, the largest island, rises to about 5,500 feet, is densely ded and intersected by deep ravines. Antumey (Annatom) is the southerly of the group, and the one in which missionary effort been most successful. Ambrym and Tanna have active volcanoes, eruptions of which are sometimes very destructive. The New rides have long been a favourite recruiting-ground for the labour- c, the natives (*kanakas*) contracting to work on the Queensland tations for a term of years.

anta Cruz.—This group, crossed by the parallel of 10° S., lying n of the New Hebrides and east of the Solomon Islands, was dis- red in 1595 by Mendaña, who named it Santa Cruz. Forgotten for ly two centuries, the islands were rediscovered by Carteret, who ed them after Queen Charlotte. They are of volcanic and coral ation, and surrounded by coral reefs. The inhabitants belong to the nesian race intermixed with the Melanesian; they are of good ique, dwell in large villages, and surround their houses with stone es. Agriculture and fishing are their chief occupations, and the men hardy sailors. The climate is humid; both the north-west and the n-east monsoons bring rain. Santa Cruz, the largest island, occupies e than half of the total area. Vanikoro, the most southerly, is the best vn.

olomon Islands.—The Solomon Islands, forming an archipelago prising twelve larger islands or groups, and numerous smaller ones, nd north-west for about 600 miles, between the parallels of 5° and . from near Santa Cruz to the Bismarck Archipelago. They contain nples of the typical low coral and lofty volcanic islands, the latter g in several points to 4,000 feet and over, and in the island of gainville to 10,000 feet. The islands are in general surrounded by l reefs, and there are several good harbours. Much of the surface is red with dense forest, and, in many instances, belts of mangrove er the coast. The soil is fertile, the yam, bread-fruit, banana, taro, -nut, pepper and coco-nut are widely cultivated. The fauna combines nesian and Polynesian types. Anthropoid apes are said by the natives nabit the woods, but this statement lacks confirmation; crocodiles are rous, and this is the most easterly group in which they are found. inhabitants belong mainly to the Melanesian race, with an admixture lynesian elements; they are skilled in carving and in the construction noes; but are still mostly in a savage condition, and cannibalism is ised. In the interior other inhabitants, probably a Negrito people,

known to the English traders as Bushmen, are in course of being e
minated by the Melanesians. The climate is rather unhealthy; temper
ranges between about 75° and 90° F., and the prevailing winds ar
north-west and south-east monsoons; the rainfall considerably ex
100 inches. The islands were discovered by Mendaña in 1567, but
remained almost unknown for two centuries, when they were v
successively by Carteret and Bougainville. The people are ruled by
chiefs, but the most northerly and largest island in the group, Bougai
Island, is a German possession, and the remaining islands are all B
The principal islands of the British group are Choiseul, and Isabel.
others are Rennell, San Christoval (Bauro), with one of the best har
in the group, Ugi, with a British coaling station, Guadalcanar, which
in Mount Lammas to 8,000 feet, New Georgia (Kausagi), and Malai
Mala Island.

STATISTICS AND STANDARD BOOKS.

See end of Chapter XXXVI.

CHAPTER XXXVI.—THE ISLANDS OF THE PACIFIC OCEAN

By the Editor.[1]

I.—GENERAL

eneral Description.—The islands of the Pacific Ocean, or South are sometimes grouped together with Australia, sometimes without continent under the name *Oceania*. They are divided by different raphers into various subdivisions, that most widely adopted being into *nesia*, or the Small Islands in the west, north of the latitude of New ea, *Melanesia*, or the Islands of the Blacks between New Guinea and and *Polynesia* or the Many Islands scattered over the rest of the ocean, nhabited by a race of men wonderfully homogeneous when one con- s the vastness of the area of dispersal and the smallness and isolation e scattered island-homes. The whole land area of all these islands— Zealand excepted—is only about 60,000 square miles. Except for a ke as to the extent of scientific knowledge regarding the coral polyp, lescription of this region by Robert Louis Stevenson in his book he South Seas," is true as well as graphic :—

That wide field of ocean, called loosely the South Seas, extends from c to tropic, and from perhaps 120° W. to 150° E., a parallelogram of nundred degrees by forty-seven, where degrees are the most spacious. n of it lies vacant ; much is closely sown with isles, and the isles are o sorts. No distinction is so continually dwelt upon in South Sea talk at between the 'low' and the 'high' island, and there is none more dly marked in nature. The Himalayas are not more different from Sahara. On the one hand, and chiefly in groups of from eight to a n, volcanic islands rise above the sea ; few reach an altitude of less 4,000 feet ; one exceeds 13,000 ; their tops are often obscured in l ; they are all clothed with various forests, all abound in food, and ll remarkable for picturesque and solemn scenery. On the other , we have the atoll ; a thing of problematic origin and history, the ed creature of an insect apparently unidentified ; rudely annular in ; enclosing a lagoon ; rarely extending beyond a quarter of a mile chief width ; often rising at its highest point to less than the stature man—man himself, the rat and the land-crab, its chief inhabitants ; nore variously supplied with plants ; and offering to the eye, even perfect, only a rim of glittering beach and verdant foliage, enclosing nclosed by the blue sea." The ring of the atoll may be of any

[1] Assisted by E. J. Hastings.

diameter from a few hundred yards to many miles; it is always nar composed of broken blocks of coral and without a blade of grass. M tony of surface is broken by groves of the coco-nut palm, "that gi of vegetables, so graceful, so ungainly." The narrow rim is often part submerged, so that instead of an annular strip the atoll becomes a ri islets surrounding a lagoon with several entrances. But the grand con in all low coral islands is that of the two beaches, the inner beach fa the lagoon, which is the harbour and the site of all houses, and the o beach on which the ocean surf always thunders, filling the whole is with its unceasing noise, and this beach is deserted, shunned by natives as the haunt of the spirits of the dead.

The Island Groups. Although the Pacific appears on the map t thickly sprinkled with islands, these are really grouped along ce lines, with vacant breadt sea between, it is to be rem bered that Ma lan, when he the Strait w bears his n and ventured the first time the unkno waters of the cific, crossed whole breadt the ocean, an three months voyaging saw no land except one barren and waterless rock. Speal generally, the depth of the Pacific appears to exceed 2,000 fath from 80° W., close to the coast of South America, to 180° W. Ac the western half of this vast abyss a narrow rise runs in the lati of the northern tropic roughly from east-south-east to west-north-w and upon it the volcanic islands of Hawaii appear. A broader much longer rise, edged by smaller parallel ridges, stretches east west along the southern tropic, bearing the innumerable atolls of Paumotu, or Low Archipelago, the Society Islands and Cook Isla Smaller scattered elevations of the sea-bed occur to the north north-west, each bearing a cluster of islets—including the Marqu and some smaller groups. The less deep water east of Australia an the Malay Archipelago is traversed by two great rises, curved n parallel to the coast, and each studded by a chain of island groups. outer line taking a bold sweep at first north-eastward from New Zeal forms the foundation whence spring the Fiji and Friendly Islands and

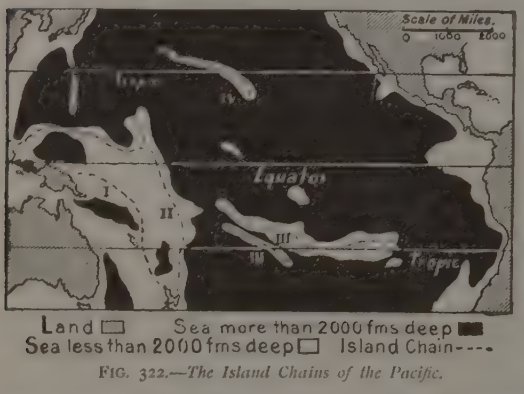


FIG. 322.—*The Island Chains of the Pacific.*

a group (in 12° S.); thence wheeling north-westward, it bears in ssion the Ellice Islands, and the Micronesian archipelagoes consisting : Gilbert group (on the equator), the Marshall Islands and the ines, and the rise finally curves inwards towards Jilolo. In 145° E. er rise branches off northward towards Japan, bearing the Marianne drone Islands, also included in Micronesia. The inner rise, which tarts from New Zealand, forms a sharper north-westerly curve, and urse may be traced on a map by New Caledonia, the New Hebrides, olomon Islands, and the Bismarck Archipelago, for all of which it s the foundation. It terminates in New Guinea. The more important ls of the Pacific (Fig. 322) may thus be treated as belonging to (i.) nner or Melanesian Chain, (ii.) the Outer or Micronesian Chain, (iii.) South Tropical or Paumotu Chain, and (iv.) the North Tropical or aiian Chain. As a matter of con- nce the islands of the Melanesian were considered with New Guinea.

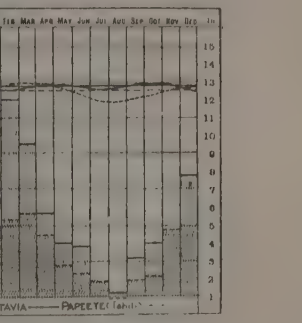


FIG. 323.—*Temperature and Rainfall at Batavia and Papeete.*

olitical Divisions.—Amongst the ered groups and islands in the Pacific ng British possessions are Fiji, the non Islands (southern), Santa Cruz, rt Islands, Ellice Islands, Phœnix ds, Union Islands, Tonga or Friendly ds, Cook Islands, Manihiki group, irn Island, besides many others, some rocks, and uninhabited. These are r the jurisdiction of the High Commis- r of the Western Pacific, whose autho- extends over all lands in the western ic, not being dependencies of any of British Colonies or of any other civilised Power. The only important ached group is that of the New Hebrides, controlled by a joint h and French commission. The French possessions come next in er and importance, including New Caledonia, the Loyalty Islands, Marquesas group, the Society Islands, with Tahiti, and most of the s of the South Tropical Chain. The total area does not exceed that mall French department, and their total population is under 29,000. lands administered by Germany include the Bismarck Archipelago Bougainville Island in the Melanesian Chain, the Marshall, Caroline, Marianne Islands in the Micronesian Chain, and part of Samoa. The l States are responsible for Guam in the Marianne Islands, part oa and Hawaii. A few of the islands in the Eastern Pacific belong th American countries.

II.—FIJI

sition and Extent.—The Fiji Islands, a scattered group about miles east of Queensland, consist of two large and a great number

of small islands, islets, and rocks, lying between 15° and 22° S., traversed by the 180th meridian. The island of Rotuma, in 12° S. 177° E., is a dependency of Fiji.

General Description.—The two largest islands, Viti Levu Vanua Levu, lie on the west and north-west of the group, separated

FIG. 324.—*The Fiji Islands.*

the cluster of small islands c the Lakemba group, on the eas the islet-starred water of the or Karo Sea. Most of the isl are surrounded by barrier r which form admirable natural b waters, crossed by deep chan giving access to the enclosed bours and roadsteads. The la islands, all composed of volc rock, are mountainous, with sum rising to or even exceeding feet. Numerous streams descend from the mountains and are utilised b natives for irrigation. Earthquakes are not uncommon, and the great waves which often follow them sometimes cause great destruction o low shores. The scenery is in many parts grand and picturesque. Ther no large native animals. Cattle have been introduced, and many now wild. Turtle and pearl-shell are obtained on the reefs, and fish off coasts. Dense forests clothe the windward side of the islands, where south-east trade-winds bring a copious rainfall. The coco-nut, ban pineapple, and many tropical fruits flourish. Sugar-cane is the plantation product, but rice and maize are widely grown, and the taro yam form the principal native foods.

People, History, Government and Trade.—The Fijians be to the Polynesian race, are of a dark copper colour, well-built and h some. Their numbers have greatly decreased since the advent of Europeans, and in 1875 about one-third of the population was carried off by a terrible epidemic of measles. The islands were discovered by Tasman in 1643. In 1835 the Wesleyan missionaries commenced their labours amongst the islanders, many of whom were then cannibals; and now Christianity is professed by all the inhabitants. The first British consul was appointed in 1859; in 1864 the leading chiefs offered to cede the sovereignty, but it was not until 1874 that the islands were taken over by the British Government, and shortly wards constituted a Crown colony. The Governor is assisted by Executive and a Legislative Council, and the local administration is ca out by native chiefs. Native labour is insufficient for the increa plantations, and labourers have to be imported from other islands.

FIG. 325.—*The of the Crown of Fiji.*

ng exports are sugar, copra and fruit, especially bananas. The prin- l imports are cotton goods, machinery and hardware, and food-stuffs. le is carried on chiefly with the United Kingdom and the Australian monwealth.

uva, the capital, situated on the south of Viti Levu, is a small town a good harbour. *Levuka*, on the small island of Ovalu, east of Viti u, the former capital and a port, occupies a narrow coast-strip backed nountains rising almost perpendicularly to over 2,000 feet.

STATISTICS OF FIJI.

	1881.	1891.	1901.
Area of Fiji (square miles)	7,740	7,740	7,740
Total Population of Fiji	127,995	121,180	117,870
Number of Native Fijians	114,748	100,321	94,397
Density of Population per square mile ..	16·4	15·7	15·2

ANNUAL TRADE OF FIJI (*in pounds sterling*).

	1875-79.	1881-85.	1891-95.
Imports..	125,000	365,000	279,000
Exports..	140,000	278,000	436,000

III.—THE MICRONESIAN CHAIN

riendly Islands.—To the east of Fiji, and clustered round the lel of 20° S., several small clusters of high and low islands, some s, and one an active volcano, were discovered by Tasman in 1643. r present English name is due to Cook, who wished to preserve the ory of his kindly reception by the natives. The native name is Tonga, n the new spelling, *Toga*, for the local chiefs are all subject to the of Tonga, who resides in Tonga-tabu, the largest island of the group. climate is hot, oppressive and humid, and hurricanes frequently occur ebruary and March. Yams, bananas, coffee, coco-nuts and arrowroot mongst the chief productions; but copra—dried coco-nut—is practi- the only export. New South Wales and New Zealand send most of mports. The people are Polynesians, and most of them now profess stianity. The islands are under British protection.

amoa.—The Navigator or Samoan Islands, lying near 14° S. and W., have become more known than most of the neighbouring groups use they lie in the direct line of the mail steamers between Australia New Zealand and Hawaii on the way to the western ports of n America. The islands are of the usual high or low type, and ly surrounded by a barrier reef. The lofty slopes facing the south- trades are well watered and luxuriantly fertile; and the climate, igh hot, is not of the worst. Disastrous hurricanes occur, and none harbours, otherwise good, are safe from their fury. The productions ible those of other tropical Pacific islands, copra being the chief. rade is in the hands of British, American and German firms; but the ls, which were for a time under the control of the consuls of the United

Kingdom, the United States, and Germany, are now divided. Upolu Savaii form a German possession ; the capital is at *Apia*, which has a harbour on Upolu. Tutuila, with its adjacent small islands, is a posses of the United States, and contains the best harbour in the group at *Pago*. The people are amongst the least spoiled of the Pacific folk in s of the measure of civilisation they have assimilated ; they are feeli described by Robert Louis Stevenson, who spent his last years in Sam

Ellice and Gilbert Groups.—The Ellice or Lagoon Islands to north-west of Samoa stretch for 360 miles between 11° and 5° S. T consist of nine large atolls or ring-like clusters of low coral islands, and account of the typical forms assumed by the atoll of Funafuti it has b made the subject of an interesting experiment in physical geogra The Royal Society of London and the Government of New South W sent out an expedition in several successive years to put down a d bore-hole through the coral in order to discover the nature of the un lying rocks and so to test the rival theories as to the origin of c islands. Although the bore was carried down 1,200 feet no rock but c was found. The people of the Ellice group are for the most part Chris Polynesians, governed by their own chiefs, under British protection.

The Ellice group is followed on the Outer Australasian Curve by Gilbert or Kingsmill Islands, a line of atolls and low coral islets wh follows the same trend and crosses the equator. The chief trees these islands are the coco-nut and pandanus, but the soil is less fe than in most of the Polynesian groups. The inhabitants are active intelligent ; and they retain practical independence under the rule of t own chiefs, supported by British protection.

The Marshall Islands.[1]—This group is formed by a numbe coral reefs, or atolls, with a total area of 160 square miles, which run two nearly parallel rows from north-west to south-east, and extend ov degrees of latitude, with their centre about 7½° N. The eastern line o atolls is called the Radak, the western containing 18, the Rälik group. islands, pure coral formations, are of very small size ; they rise only a feet above the surface of the sea, and only on one has the wind heaped so much sand that it forms an elevation which might be called a hill. E atoll, though of most irregular shape, encloses a deep lagoon, into w ships can enter through passages between the islands. On none of the there any deep soil ; a thin layer of earth has been formed by the dec vegetation, in which the coco-nut palm stands most prominent. Bread-f trees, various kinds of pandanus, bananas, and a fibrous plant whi used for mat making, nearly complete the flora. Taro is grown for f The fauna is very poor. Fish and crustacea abound in the lagoons on the reefs, where the natives catch them in large quantities as the animal component of their chiefly vegetable diet. The climate is hot

[1] By Graf von Pfeil.

moist, the rainfall being nearly the same in all months of the year, the exception of perhaps January and February, which are drier. remarkable that, although these islands are in the northern hemi- re, the warmest month in the year is January and the coolest July. inhabitants are Micronesians, their colour varies between lighter and er shades of coffee-colour ; they are well grown, and their features are ant. Great navigators, they construct curious charts with little sticks, hese are not intelligible to Europeans. The population is increasing. islands form a German colony, and the Landeshauptmann stands at ead of the administration, the expense of which is defrayed by the t trading company.

Caroline Archipelago.—The Caroline Archipelago, including the w Islands, stretches from east to west between the equator and 10° N., consists of about thirty-five groups. Some of the islands are volcanic, most of coral origin, and all surrounded by reefs. They are generally -wooded and fertile ; their products being the usual wealth of coco- , bread-fruit, bananas, pine-apples, taro, and yams. The inhabitants, are called Micronesian, are of a very mixed descent. They are rned by their own kings or chiefs. The Caroline Islands were dis- red by the Portuguese in 1526, and in 1686 taken by the Spaniards and ed after Charles II. of Spain ; but they were little known to Europeans re the nineteenth century. The Pelew group had, however, previously ired an honourable name through the kindness shown by the inhabi- s to the crew of the *Antelope* wrecked in 1783. In 1899 the Caroline ipelago and the Ladrones were sold by the Spanish government to many. Although so near the equator, the climate is pleasant, the being tempered by sea-breezes. The volcanic island of Ponape in east is the largest of the archipelago, with a good harbour at *Kiti*. central Truk, or Hogolu Islands, form the largest group. Yap, or Guap, he most important island in the west. These islands contain a ber of remains of an ancient people skilled in the building of cyclopean nry, but as yet presenting an unsolved problem as to their origin, the d when their great works were carried out, and their ultimate fate.

adrones.—The Marianne or Ladrone Islands run north between nd 21° N. along the meridian of 145° E. They include two distinct ps : a northern, containing ten high volcanic islands, with still active noes ; and a southern, with five low coral islands. The flora has modified by the introduction of plants from the Philippines. Maize e principal cereal ; but potatoes, yams, sugar-cane, and various fruits lso cultivated. The aboriginal inhabitants—Chamorros of Indonesian n—scarcely exist now as a distinct race, owing to admixture with es from the Philippines, and Spanish. The climate is healthy, and, igh two seasons are recognised, the rainfall is distributed throughout ar. Destructive hurricanes sometimes occur, and slight earthquakes equent. The islands were the first discovered by Magellan in 1521,

and called, from the habits of the people, Ladrones or Robbers. In
they were taken possession of by the Spaniards, and re-named after
Empress Marie Anne of Austria. Guam is the largest island of
archipelago, occupying more than half of the total area and contai
most of the population. The coasts are mostly rock-bound; but the
of *San Luis de Apra*, or *Caldera*, is the best in the archipelago, an
the island is *Agaña*, the principal town. The name of Guam has acqu
a curious significance for Pacific traders wishing to keep their destina
secret, often clear from Australian ports for Guam, the most dis
harbour among the islands, and one to which there are many routes.
belongs to the United States; the rest of the Mariannes are German.

IV.—SOUTHERN POLYNESIA

Cook and Tubuai Islands.—A narrow line of small rises run
from 18° to 28° S., parallel to the wider elevation of the ocean-bed w
bears the Low Archipelago, is crowned by the volcanic groups of
Cook Islands in the north-west and the Tubuai Islands in the so
east. The people, who exhibit Malay affinities, are darker in comple
than the Tahitians. The mountainous islands are fertile, producing
plantation products common to the latitude and the soil. Governm
is administered through native chiefs, though under the superintende
of European Powers. The Cook or Hervey Islands are now annexe
the colony of New Zealand. Raratonga is the largest (thirty sq
miles) and most picturesque of the islands, a volcanic mountain ri
wooded and surrounded by a coral reef. The Tubuai or Austral Isla
five in number, are French possessions.

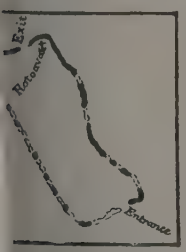
The Society Islands.—The broad band of island groups, w
stretches between 10° S., and the tropic of Capricorn, from 155° W
130° W., forms several groups, some of which have been under Fre
protection since 1842, and almost all are now administered by the Fre
The Society Islands, lying between 16° and 18° S., form the
important groups in the South Pacific. They comprise Tahiti and n
smaller islands arranged in two groups, the Windward, and the Leew
They are all volcanic and mountainous, well watered by numer
streams, densely wooded, and surrounded by coral reefs. Copra
mother-of-pearl are the chief commercial products; but coco-nu
cotton, vanilla, oranges, and an edible fungus much appreciated by
Chinese, are exported. The inhabitants belong to the Polynesian race

Tahiti was discovered by Quiros in 1606 and named La Sagitta
in 1767 it was re-discovered by Captain Wallis, who gave it the nam
King George Island, but its native name, formerly spelled Otaheite, is
alone used. Tahiti was Captain Cook's favourite centre when explo
the Pacific, and here he observed the Transit of Venus on his first g
voyage of circumnavigation in 1769. On this occasion he gave the n

ociety Islands in honour of the Royal Society of London. English ionaries settled in the island in 1797 and met with some success for ne. A French protectorate was declared in 1842, and subsequently in the two groups were formally annexed by France. *Tahiti* con- of two mountainous peninsulas united by thmus. The coasts are low, but the central s of the islands are traversed by a ridge mountains whose highest summit ap- ches 7,500 feet. From this ridge wooded s extend on each side, enclosing fertile s and valleys. Matavai Bay, in the north ie island, is the best harbour, but there are ral others. *Papeete*, the capital and seat of rnment of French Oceania, is a modern picturesquely situated at the foot of ntains on the north-west, and surrounded groves of coco-nut, orange and guava trees. Point Venus, the most herly point in the island, was the station for observing the Transit of is in 1769. Owing to the many observations which have been made, ngitude, 149° 28′ 21″ E., is said to be the most certainly determined ie Pacific.

FIG. 326.—*Tahiti, a typical high island.*

Low Archipelago.—The Tuamotu, Panmotu, or Low Archipelago, ains about eighty low coral islands and numerous islets lying between nd 24° S. to the east of the Society Islands. The inhabitants, who under French administration, belong to different branches of the nesian race; some resemble the Fijians, others the Tahitians. They honest, industrious and thrifty, qualities which often distinguish dwellers on coral islands where hard work is necessary for a livelihood from the lazy and careless inhabitants of the fertile volcanic islands, where life is easy. There is considerable trade in copra, pearl-shell, and pearls. Anaa, discovered by Cook in 1769, is one of the smallest but most populous of the group, well cultivated and yielding about one-fourth of the exports. Huo Island was discovered by Bougainville in 1768, and it is interesting as having been the scene of some early investigations on the structure of coral islands carried on by Sir Edward Belcher.



7.—*Fakarava, a typical or low island. Dry land , partially submerged lotted. The atoll mea- 40 miles by 15.*

Fakarava, the atoll on which *Rotoava*, the capital of the archipelago, is situated, owes this distinction to the fact that its lagoon has two channels—one to windward, the other to leeward—so that the small -vessels which carry on the trade of these islands can enter and leave fair wind.

The Manga Reva or Gambier Islands are a small group of Fre islands lying south-east of the Low Archipelago, with which they sometimes included.

V.—SCATTERED GROUPS

Marquesas.—The two groups forming the Marquesas or Men Islands lie between 8° and 10½° S. The islands are of volcanic forma mountainous and rugged, intersected by ravines and valleys of exqu beauty, and generally fertile. The soil is well adapted for the growt cotton, which, with a fungus for the Chinese market, forms the prin export. The natives keep a good many cattle. The climate is sultry temperature seldom falling below 73°, but the islands are neverth healthy. The inhabitants are of the Polynesian race and nearly allie the Tahitians ; their moral standard is very low, worse than in the days of heathenism, and the European vices and diseases, which rapidly killing them off, have become subordinate to the Chinese vic opium-eating. Formerly the natives of the Marquesas were celebr above all Polynesians for the beauty of the tattooing with which ornamented their whole bodies. Some of the islands were discovere Mendaña in 1595 ; the others by Cook in 1774. They were taken po sion of by France in 1842. Nuka-Hiva is the largest island of the a pelago ; it affords the best anchorage in the bay where *Tai-o-hae*, the of the French Resident, is situated.

Central Groups.—Between the Society Islands and Hawaii the of the ocean rises in a series of isolated elevations forming a line dire towards the north, and each is crowned by one or several islands o familiar Polynesian type. The scattered coral Manihiki islands lie a 10° S., and of them Penrhyn Island, the largest of the group, is the one regularly inhabited, the people living by pearl-shell fishing ; the ot are only visited occasionally by collectors of coco-nut produce and gu Malden, Jervis, Christmas, Fanning, and Palmyra Islands carry on chain, the last named being situated in about 6° N. The whole are under British protection.

Juan Fernandez Islands, situated near 34° S., between 400 and 500 from Valparaiso, were discovered by Juan Fernandez about 1563. largest island, Mas a Tierra, is famous for the five years' residence of ander Selkirk, the possible original of Robinson Crusoe. The islands form a Chilean possession.

Galapagos Islands.—On the equator, in 90° W., the volcanic gro the Galapagos (*i.e.* Tortoise) Islands lies at a distance of 750 miles the coast of Ecuador, to which country they were annexed in Albemarle, the largest island, is sixty miles in length, and there four other islands of fair size, and eight smaller. The climate is co than that of any other equatorial land at sea-level, on account of

uction of temperature by the Humboldt current. The lower ground of islands suffers from want of rain, which, however, falls in sufficient ntity on the higher slopes, and some plantations are worked. The a and fauna of the islands are peculiar. No palms of any kind grow them, and out of about 400 species of plants which have been found, rly 200 are absolutely confined to this group. All the reptiles are hout representatives elsewhere; but the giant tortoise, from which islands took their Spanish name, is likely to become extinct if not tected; it has already vanished from some of the islands. Very ge turtles frequent the coasts. Amongst the birds there are some -fowl of antarctic species, another result of the cool current from the th.

Pitcairn Island.—Pitcairn Island in 25° S. and east of the Low hipelago, is a small mountainous and rock-bound but fertile island. inty Bay, one of the two possible landing-places for boats, is the ce where vessels communicate with the inhabitants by means of their oes. Yams and potatoes form the staple food of the islanders. ere are no springs on the island, and the water supply is derived m rain. The island was discovered by Carteret in 1767. In 1789 ne of the *Bounty* mutineers with Tahitian wives reached it, and nained absolutely unknown to the outside world for twenty years. ing to the resources of the island becoming inadequate for the growing ulation, then numbering nearly two hundred, they were, by agree- nt, removed in 1856 to Norfolk Island. Some of these, however, rned to Pitcairn Island, in 1859 and 1864, where they and their cendants remain, now numbering 140 persons.

Easter Island.—The remotest islet of Polynesia, far to the east every other group, is Easter Island, or *Rapa Nui*, in about 27° S. 109½° W. It lies 2,030 miles west of the coast of Chile, to which belongs. It is of volcanic origin, triangular in form, highest in north, where it reaches 1,970 feet, and contains several distinct ers. Cook's Bay or Hanga river on the west is the principal horage, and round it the inhabitants chiefly dwell. The vegetation is ty, and there are no trees, though the soil appears to be not infertile. climate is temperate and healthy. The island is remarkable, for in of its overpowering isolation, it harbours a clue to the migrations n earlier and vanished race of men, whose colossal works are also d in the Carolines, 7,500 miles away at the opposite corner of the l world. These take the form of sculptures, including numerous itic stone busts carved out of trachyte, sculptured stones and a ber of well-preserved stone houses of unguessed antiquity. No ng Polynesian race is competent to produce such work. According tive tradition, their ancestors came from Rapa, 1,900 miles to the in two large canoes. Easter Island was discovered by Roggewein aster Sunday, 1721—hence its European name. During the first

half of the nineteenth century, the population numbered about 3,0 divided into tribes, and ruled by an elected king. In 1863 a party Peruvians carried off nearly half the population to work the guano in t Chincha Islands. There many died, and of those who were sent back t few survivors brought with them diseases which have since caused gr ravages. Hence the population has rapidly decreased and is now sm A Tahitian firm has formed a station on the island, and large numbers cattle and sheep are being raised.

VI.—HAWAII

Northern Tropical Chain.—Hawaii, formerly called the Sandwi Islands, stands on the long narrow rise which runs across the centre of t North Pacific Ocean. The actual island chain (Fig. 328) extends for 3 miles from west-north-west to east-south-east between the parallels of and 22° N. and t meridans of 155° a 160° W. North of t main group, a slend chain of uninhabit islets and rocks stretch west by north for abo 1,350 miles.

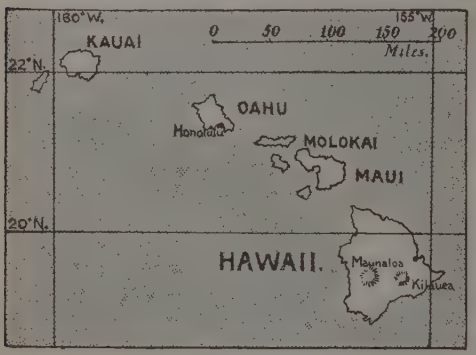


FIG. 328.—*The Hawaiian Islands.*

Character of t Land. — The islan rise abruptly from de water, for the ocea rise whence they spri is an elevation on when compared w the enormously de abysses surrounding it. The coasts are usually steep and uniform, wi occasional narrow strips of beach, but having few openings where shi may find shelter. The whole group is purely volcanic, and contains t loftiest summits of any oceanic islands, the cones of Mauna Loa a Mauna Kea, in Hawaii, soaring to the majestic height of close on 14,0 feet. Valleys and deep gorges, eroded by the ample rainfall, intersect t slopes, and wide areas even of the more level ground are covered with t lava outpoured in successive eruptions. The subterranean forces a extinct in the western section of the islands, but in the eastern th are still fiercely active and present the most colossal workings of volcan energy known on the surface of the Earth. Much of the surfa water sinks through the porous soil, forming springs at lower level and small streams vivify the surface in every island. The scenery

aried; in parts wild, rugged and bare; elsewhere softened by rich orests, the picturesque valleys adorned with a rich variety of ferns; nd the low slopes and coast-lands set with groves of coco-nut palms, read-fruit trees, and screw pines. The flora is extensive, and about alf the species are peculiar to the islands. Amongst characteristic ees are the *koa*, the candle-nut tree, and the *ohia* (mountain or wild pple); the latter forms, especially in Maui, large natural orchards, ielding refreshing fruit. There are no indigenous mammals larger than ne rat, unless, indeed, the dog and pig may be so considered, no snakes, nd few insects; birds are better represented, and fish abound. Horses, attle, sheep, and other domestic animals have been introduced, and are ow numerous.

Climate.—The climate is remarkably moderate; owing partly to the nfluence of the oceanic currents the temperature is about 10° lower nan that of other countries in the same latitude. The mean tempera- ure ranges between 52° in winter and 91° in summer, the mean for ne year being about 74° F. Only two seasons are recognised, and ne greatest rainfall takes place in winter. In the higher parts the air is racing. The climate is, on the whole, healthy. Leprosy is, however, ndemic.

People, History and Government.—The people are fair for Polynesians, well built, good-tempered, and fairly industrious. The race, owever, appears to be slowly dying out here as in the other Pacific slands. Captain Cook visited Hawaii (which he described by the name of Owhyhee) in 1778, but there is evidence that the islands were previously nown to the Spaniards. On Cook's return to the islands in 1779 he was nurdered by the natives on account of a misunderstanding. During the atter part of the eighteenth century, Kamehameha I. brought all the islands nder his personal sway. The familiar Polynesian system of *Tabu*, by vhich persons, places, or things were interdicted or declared sacred, was ne great lever for the exercise of authority. The son and successor of the ounder of the monarchy broke the Tabu, disavowed the old idols, and ncouraged the American missionaries who settled in the islands in 1820. n 1840 a constitutional government was established under Kamehameha II. and recognised by European Powers. In 1893 a dispute occurred etween Queen Liliuokalani and her ministers which led to the establish- ient of a republic; and in 1898 the islands were annexed by the United tates as a territory. A telegraph cable unites the islands with America.

The position of Hawaii "at the cross-roads of the North Pacific" on ne line of vessels trading between the ports of western North America, n the one side, and those of Japan, China and Australia on the other, as greatly promoted its commercial development. Regular lines of eamers touch at Honolulu from San Francisco, Vancouver, Yokohama, ongkong, Sydney and Auckland. Good roads have been constructed, d more than 100 miles of railway. The soil is in great part fertile, and

almost all tropical and subtropical products flourish. Agriculture is t principal industry. Sugar is the staple product, and accounts for all b a small proportion of the exports. Coffee, rice, hides and bananas a next in importance. The chief imports are provisions and manufactur goods, and practically the whole of the trade is with the United States.

Honolulu, the capital, is situated on the south coast of Oahu Island, a contains an extraordinarily cosmopolitan population. It has seve handsome public buildings. South-west of the town is the pictures promontory of Diamond Head, and at its base Kapiolani Park.

Islands.—Hawaii, the largest and most southerly of the group occupied in the central part by a plateau from which rise the exti volcano of Mauna Kea (13,800 feet), the active crater of Mauna L (13,650 feet), from the rim of which fields of bare lava slope outwards a downwards for about 4,000 feet, and Hualalai (8,300 feet), which was active in 1811. The chief crater is, however, not at the summit, bu Kilauea, about eighteen miles distant on the eastern slope, at an altitud about 4,000 feet. This is about nine miles in circumference, the de varying from 700 to 1,100 feet, with the rise and fall of the molten m The greater part of the surface is covered with lava solidified in rug masses, but openings occur in the crust in which the intensely hea liquid lava rises and falls, sometimes thrown high up into the air, whe is caught by the wind and drawn out into long threads, like spun g called by the natives "Pele's hair," from one of their old goddesses. island contains many interesting buildings connected with the anc worship and the former kings.

Maui is an island formed of two lofty peninsulas connected by a isthmus. In East Maui is the extinct volcano of Mauna Halea "Temple," or "House of the Sun," about 10,000 feet high, with the lar crater in the world, about twenty miles in circumference. Molokai small mountainous island; on its northern coast the leper asylum Hawaii is situated. Oahu, on which the capital stands, is picturesque the fertile plain of Ewa in the centre. Kauai, sometimes called garden island, is the most northerly of the main group, and in parts adapted for agriculture.

STATISTICS OF HAWAII.

	1884.	1896.	1900.
Area of Hawaii (square miles)	6,640 ..	6,640 ..	6,640
Population of Hawaii	80,578 ..	109,020 ..	154,001
Density of Population, per square mile ..	12 ..	16 ..	24
Population of Honolulu	20,487 ..	29,920 ..	39,305

Population (1900): Hawaiians, 29,834; Japanese, 58,500; Chinese, 25,742; White, 28,533.

ANNUAL TRADE OF HAWAII (*in pounds sterling*).

	1891–95.
Imports	1,156,500
Exports	1,852,400

THE PRINCIPAL ISLAND GROUPS OF THE PACIFIC.

	Area (square miles).	Approximate Population.	Protectorate.
I.—Melanesian Chain:			
New Caledonia and Loyalty Islands	7,630	60,000	French
New Hebrides	5,300	75,000	Brit. & Fr.
Santa Cruz	360	5,000	Native
Solomon Islands	12,000	70,000	British
Bougainville Island	5,000	20,000	German
II.—Micronesian Chain:			
Fiji	7,754	118,000	British
Tonga Islands	374	19,250	"
Samoa	1,700	39,000	Ger. & U.S.
Ellice Group	14	2,400	British
Gilbert Group	166	35,200	"
Marshall Islands	158	15,000	German
Caroline Islands	370	40,000	"
Pelew Islands	190	3,000	"
Marianne Islands	420	10,200	"
III.—South Tropical Chain:			
Cook Islands	142	8,400	British
Tubuai Islands	110	880	French
Society Islands	630	16,300	"
Low Archipelago and Gambier	390	5,470	"
IV.—Scattered Groups:			
Marquesas Group	480	4,450	"
Pitcairn Island	2	130	British
Easter Island	55	150	Chilean
Juan Fernandez Group	150	—	"
Phœnix Islands	16	60	British
Manihiki Group	12	1,000	"
Tokelau	12	520	"
Galapagos	2,950	200	Ecuadorian
V.—North Tropical Chain:			
Hawaii	6,700	154,000	United States

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BOOK IV.: NORTH AMERICA

CHAPTER XXXVII.—THE CONTINENT OF NORTH AMERICA.

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Resemblances between North and South America.—T number of continents interrupting the great ocean is so small that it difficult to determine what are essential and what are unessential co tinental features. The overgrown land area of Eurasia and the sm continent of Australia are so unlike in structure and form that no ju comparison can be drawn between them without straining the slig resemblance of parts that are imagined to correspond with one anoth If all the continents were as much alike as North and South America, t problem would be much simpler. Here distinct resemblances with assured basis in geological history may be discovered ; and perhaps f this reason the repeated features of these two land masses are often tak as the essential features of continental form.

In a very general way, the two Americas each have a greater belt mountainous highlands along their western side ; and two lesser highlan on the north-east and south-east. The greater highlands include ma volcanic cones and lava sheets, and intermont basins ; and the draina of the latter frequently fails to reach the sea. Eruptive and mountai making disturbances have here been in operation in relatively rece geological periods. The lesser highlands owe their deformed structur to ancient disturbances, although their present altitude above sea-lev may have been gained by uplift at a comparatively modern date in t Earth's history. North-east of each of the north-eastern highlands lies archipelago ; but the islands of the two archipelagoes are very unlike size and origin. Between the western and eastern highlands lies extensive belt of plains at a moderate altitude above the sea-level, a with ill-defined divides between the chief river systems. The Macken and Orinoco flow northward, the St. Lawrence and Amazon flow eastwa and the Mississippi and La Plata flow southward.

Contrasts between North and South America.—Althou differing in a host of minor details, these large resemblances serve establish true continental homologies ; but their value would be lost the comparison were pressed too far. The most important points of co

st result from the situation of North America chiefly in the north tem-
rate zone, while South America has its greatest width in the torrid zone.
e Arctic archipelago includes one of the two great glacial sheets now
sting; and its shores are bound by the ice foot every winter. The
est Indies rise through warm ocean currents into the warm trade winds;
ir largest island bears elevated coral reefs, and living coral reefs border
ny of their shores. The freezing waters of Baffin and Hudson bays
d the cold Labrador current that they give forth have no likeness in the
aldrons" of the Carribean Sea and the Gulf of Mexico, or in the warm
rrent that flows from them. Under the severe climate of the far north
lichens and mosses of the "barren lands" west of Hudson Bay, and
coniferous forests of the inhospitable uplands of Labrador have little
eness to the grassy llanos of the Orinoco and luxuriant tropical forests
Guiana. The direct and indirect results of glaciation, so pronounced in
rth America, include features so important as the Great Lakes of the St.
wrence system, for which the Amazon, under the equatorial rain belt,
s no parallel. Tropical North America, with mangroves and coral reefs
ng its shores, malaria on its coastal lowlands, and an agreeable climate
its plateaux, forms a striking contrast to the narrowing southern ex-
mity of South America, whose inclement climate illustrates the real
aracter of the misnamed "south temperate zone."

Resemblances between North America and Eurasia.—A com-
rison may be drawn between North America and Eurasia in which
matic as well as structural and topographical features have certain
iking resemblances; but here the repetition is like that of the two
nds, Eurasia being on the right and North America on the left of the
s of symmetry. The correspondence extends to so many structural
tures that it has been an embarrassment to the science of geology, by
ing some basis for the belief that all the world was made on the pattern
ich north-eastern North America so largely duplicates from Europe.
e Laurentian highlands correspond to Scandinavia and Finland; com-
sed of very ancient and greatly denuded rocks, highest and deeply
rded on the Atlantic side, decreasing in altitude inland, and lately (as
Earth views time) depressed and submerged in Hudson Bay and the
lf of Bothnia. Newfoundland and the Maritime Provinces, with the
jacent shallow ocean waters on the fishing grounds of the Banks, may be
ired with Great Britain and Ireland, and the shallow waters of the con-
ental shelf there adjoining. The St. Lawrence system, from its broad
lf to the great lakes is represented by a more submerged belt from the
rth Sea through the Baltic to the Gulf of Finland; while the extensive
es further north in Canada are represented by the larger lakes of north-
stern Russia. The Appalachians, with their basins of deformed coal
easures stretching from Nova Scotia to Alabama, may be likened to an
cient coal-bearing mountain system of similar date, which extends from
ales across Belgium and far eastward into Germany. From the

Laurentian and Scandinavian highlands, extensive ice sheets have spre over the adjacent lands in geologically recent times; advancing chie south and south-westward in North America, and south and south-eastwa in Europe; leaving the land dotted with lakes, and creating new landsca in the heavy drift deposits left on the peripheral areas (Figs. 52 and 32 The fertile prairies of the Ohio and upper Mississippi basin and further no to Winnipeg, underlain by widespread Palæozoic formations, correspo to the Russian plains of horizontal Palæozoic strata. The treeless pla formed largely by Cretaceous and Tertiary sediments, slowly ascendi towards the base of the Rocky Mountains, match the Asiatic steppes Tertiary deposits, slowly ascending towards the great mountain chains central Asia. In both these regions of great horizontal extent and sm vertical relief, the rainfall decreases with distance from the Atlantic, a the innermost districts are sub-arid or desert. Not until the mass mountain chains of central Asia are reached can we find the homologue the western mountainous highlands of North America.

East Coast.—The coast lines of North America offer many ill trations of the manner in which relatively slight movements of elevat or depression of a continental mass cause important changes in boundary, and introduce peculiar controls over the occupations its inhabitants. From New England north and west nearly to t mouth of the Mackenzie river, the land now stands somewhat lov than its average position during a considerable part of Tertia time; hence the coast is generally bold and rocky, many deep ba indent the land, outlying islands stand off shore, and the submerg lowlands broaden the continental shelf. The Gulf of Maine with branch into the Bay of Fundy, the Gulf of St. Lawrence heading in great estuary that leads tide water seven hundred miles inland, Huds Bay and the many channels between the Arctic islands must all regarded as occupying "drowned lowlands." It is true that in geologica recent times a movement of uplift has carried wave-cut cliffs, wave-bu beaches, and bay-floor sediments above the present sea-level around great part of this continental border, thus partly restoring to the lan what they had previously lost; but as the shore line is still fringed w bays, inlets, and fjords, the uplift cannot have been so great as the depr sion that preceded it. The outlying area of Greenland is a great plat of ice and snow, burying a rugged land, whose shore line is fjorded l that of its neighbours.

From New York city southward, the dominating continental movem of recent times has been upward; for the coastal plain of the Atlan States and of the Gulf of Mexico (see Figs. 353 and 360), demonstrat elevation as clearly as the bays and fjords further north demonstra depression. Here the coast is low and flat, fringed with sand reefs bui by wave action on the shallow sea bottom. The elevation is complicate with recent depressions of slight amount, by which certain open valley

g the coast from New Jersey to North Carolina have been transformed shallow arms of the sea; but this depression is evidently of less nt than the general uplift that preceded it, for the arms of the sea om reach to the inner border of the coastal plain. In spite of the ression, the continent retains some of the breadth gained by elevation, lcome addition to the land surface in a latitude of mild climate, fully pensating for the submergence of certain lowlands further north, re the sea water is probably as valuable in providing fishing grounds harbours as the lost lowlands would be for farming under the colder f those higher latitudes.

West Indies.—Although the West Indies were in an earlier para- h associated with South America, they may here be briefly described the northern continent. They offer three distinct types of land forms. larger islands, trending east and west, are the crest of great ridges divide the adjoining seas into well separated compartments, and these es are best regarded as the submarine beginnings of an Antillean ntain system. Many of the Lesser Antilles, arranged in a curved line recalls the island loops bordering eastern Asia, are of volcanic origin. Bahamas are low islands of organic growth, formed in large part vind-blown coral sand, of flat surface, and now partly submerged by nt depression. They have steep submarine slopes to the north-east, re the land rapidly descends to great depths beneath the Atlantic.

West Coast.—The western coast of North America repeats certain ures of the eastern coast, but with diminished breadth. North of ude 48°, there is the ragged outline that results from recent sub- gence; but the measure of submergence appears to lessen along the tern side of Alaska, where the great delta of the Yukon would imply the land has been more stable than further south-east. The Aleutian nd chain, chiefly volcanic, is the first of the series of loops fringing eastern border of Asia. For this reason, as well as for certain other ures of resemblance, the frozen lowlands of north-west Alaska may be er closely associated with those of north-eastern Asia, the two being rated only by the narrow and shallow waters of Bering Strait. Along oast of southern Alaska and British Columbia, submergence has led sea far into the valleys of the mountainous highlands. Some of the longitudinal valleys, beyond the outer ranges, are now under water, ing "canals" of great value for coastwise navigation; the enclosing stands forth in a chain of hilly and mountainous islands. The land bout commonly plunges at so steep an angle into the sea that level nd is wanting along the shore, except where rivers have built their s forward in protected bay heads.

rther south, the western coast of the United States and of Mexico its signs of comparatively recent elevation, of increasing distinctness ward. Elevated beaches are described in Washington and California. of coastal plains occur along the Mexican coast, but they nowhere

attain the breadth of those bordering the Atlantic, and moreover orderly movements have disturbed many of the littoral structure California in comparatively recent times; these movements being as ated with the modern periods of growth of the western mountain sy and having no analogy along the Atlantic coast. Notable among trations of these littoral disturbances are the islands that lie off the of southern California, separated by deep-water channels from the land, and having the appearance of disordered and dissected blocks o Earth's crust, here rising above the level of the sea. Appropriate region of recent disturbance, the continental shelf is of very mod development, averaging not more than ten miles in breadth along coast of California. It is trenched at numerous points by "subm valleys," which are taken to indicate that for a relatively brief perio continental border stood higher than at present, but the submergenc which the present relative attitude of land and sea were gained did suffice to produce a coast of very irregular outline, and this down movement may be regarded as only an episode in a more general n ment of irregular elevation.

On the coast thus fashioned, the attack of the sea has cut cliffs or headlands, and has formed concave shores of sweeping curvature i re-entrants; well protected harbours are therefore relatively rare. The re-entrant of the southern coast is the Gulf of California; this seems a trough of local depression, while the enclosing peninsula of L California is a mountain range of local and irregular elevation. Valley of California between the Sierra Nevada and the Coast Ran another trough of local depression; but here the trough is filled with waste washed from the adjoining mountains, and forming a fluviatile p The sea enters a short distance inland from San Francisco, here ma the only strong re-entrant for a long distance along the Pacific borde has naturally become the site of the metropolis of western North Ame

Laurentian Highlands.—The chief subdivisions of North Am may now be reviewed in a general way. The Laurentian Highlands, outliers in the Adirondack Mountains of New York and in the ru uplands of northern Wisconsin and north-eastern Minnesota, consist of ancient rocks. Their coarsely crystalline texture shows that the rocks visible once lay far under ground; for only deep within the crust can rock texture be produced. Their greatly deformed structure indi that the rock masses which formerly rose above the present surface possessed a vigorous mountain form; for mountains are the only appropriate to such structures at the period of their deformation. comparatively even surface of the highlands of to-day must therefo regarded as the denuded platform of an ancient mountain system; fo by great denudation can the former mountain cover of the existing tex and structures have been removed. But all this must have happened i dawn of geological time, for the ancient mountains were worn low

gh for some of the oldest fossiliferous strata to be laid upon their flanks
their borders were submerged beneath an ancient sea. The Laurentian
lands may therefore be viewed as part of a very ancient land; one of
arliest and most extensive lands of the globe.

nce the time when all this happened the geological history of the
n has been uneventful. It has probably suffered repeated move-
s of elevation and depression, with corresponding alternations of denu-
n and deposition; but as all the flanking Palæozoic strata are still
tially horizontal, no disorderly crushing and no great uplifts and disloca-
can have taken place since their deposition. During certain periods
derate elevation, valleys were eroded in the borders of the highlands;
hese, now partly drowned, determine the bays and fjords of the coast.

lacial Action.—Most notable of all events since the great denudation
rly time is the glaciation of the Laurentian region in a very modern stage
e Earth's history; a time
these highlands resem-
the Greenland of to-day.
ce sheets crept far south
west overland, and the
s of their invasions on
ordering regions are of
geographical import-
The highlands them-
s, scoured under the ice
s, present a succession of
mounds and irregular
ws, drained by disorderly
undeveloped streams.
we find ragged lakes,
having more than one
; forested swamps and

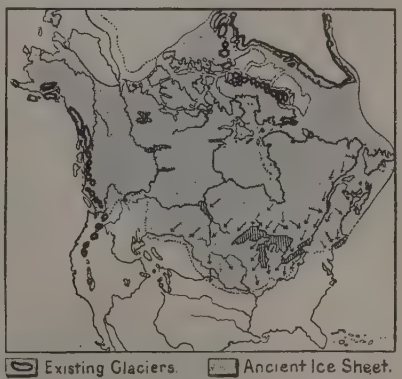


FIG. 329.—*The Glaciation of North America.*

y marshes traversed by sluggish streams; split rivers including large
nds" tens of miles in length, between the divided channels; stretches
ooth streams in open valleys alternating with falls and rapids in rocky
es. This great region, barren in the north-west, forested in the south-
is an irredeemable wilderness.

short distance outside the highland border, where the Palæozoic
lie upon the floor of the older rocks, broad plains alternate with large
that occupy depressions in the weaker layers; ten or more important
bodies lie in a curve from Lake Ontario to Great Bear Lake. The
y of these lakes has gained an almost dramatic interest in recent years,
has been shown that they are the residuals of much greater lakes that
time occupied the lacustrine belt when the present outlets were closed
ie retreating ice sheet of the last glacial invasion. The expanded
s of the glacial-marginal lakes carried silt from the melting ice, and

the lake floors now laid bare form smooth prairies of fine deep soil, yie great crops of wheat if not too far north. Their fertility coupled modern means of transportation have seriously affected the commer the food supply of the world. The lakes still remaining afford a marve system of inland waterways.

South and west of the lake belt, glacial action has been on the constructive, instead of destructive. For tens of miles together, not a of rock is to be seen ; the surface is heavily sheeted with glacial drift greater part of which has a fine and fertile soil. Although comm treated as if pertinent to geology, it cannot be questioned by those know the appearance of this vast drift-covered prairie region that g action has many geographical consequences.

Appalachians.—The Appalachian highland, extending from foundland to Alabama (and probably reappearing west of the Mississip

FIG. 330.—*Configuration of North America.*

Arkansas and Indian Territor one of those old mountain ra made in the earlier and m ages of the Earth's history ; so ago that the original moun have been for the most part down to lowlands ; their pr moderate height is due to the success of the most enduring in resisting complete denuda or to a relatively modern upli the region to upland height ; both causes combined. Bein old, the Appalachians have of the bold and irregular form younger and more vigorous m tains, where lofty peaks rise tween deep passes. Ridges even crest lines and broad uplands separated by open and popu valleys are the prevailing forms. Only the culminating parts of system, the White Mountains of New Hampshire and the Black M tains of North Carolina, retain distinctly conical or peak-like forms, even here, forests clothe most of the mountain slopes, only occasi summits rise above the tree line, and bare, angular crags are seldom s The middle part of the system, known as the Allegheny Mountain Pennsylvania and Virginia, is of moderate elevation, and is intersecte many and broad valleys. Immigration into the Ohio valley was here obstructed by the mountain ridges than by the Allegheny plateau w lies west of them.

Trends in a north-east and south-west direction predominate in Appalachians, as may be seen in the land arms and fjords of Newfo

and Nova Scotia, as well as in the ridges and the valleys of the ghenies in Pennsylvania and Virginia. The boundaries of the system f interest in connection with its physical history. From New York ewfoundland the Appalachian belt of New England and the Provinces nder the sea on the east and north-east; its structures do not end, they ly descend beneath the sea and are lost to sight on account of a recent nental depression. As the uplands slant down to lowlands near coast they are occupied by a large population, especially in the our cities where manufacturing and commerce are active. Further d the population is almost limited to the open valleys. From New to Alabama, the Appalachian structures decrease in height to the -east and south, and disappear under the coastal plain of the Atlantic Gulf States; the inner margin of the plain roughly marks the shore f an earlier period of continental depression. Here a rural popula- occupies the broader valleys and the lower uplands; the chief cities g associated with the inner border of the coastal plain, where rapids e outflowing rivers afford water power; and again with the outer er of the plain where the bays and the estuaries give harbourage to ping vessels. Only on the north-west is a true termination of the ntain system discovered. Here the deformations that give so distinct nd to the upland ridges and valleys of the Appalachians die out. The entian uplands and the Adirondacks, consisting of ancient rocks long sturbed, adjoin the Appalachians of the Provinces and of New and; the Allegheny plateau, of nearly horizontal sedimentary strata, ns the Appalachians of the middle and southern States.

he Allegheny plateau is known as the Catskill Mountains in New , and the Cumberland tableland in Tennessee and Alabama. Between two extremes much of its hilly surface is known as the Allegheny ntains, although this term should properly be restricted to the long, -crested ridges that lie next to the south-east from Pennsylvania to nessee. Taking the plateau altogether, it descends by a strong escarp- into the valleys of the Alleghenies on the south-east, while it ually decreases in altitude towards the prairies of the middle Ohio Mississippi on the west. Throughout this plateau, as well as among Pennsylvania ridges on the east and under certain of the prairies er west, lie the great stores of coal on which the industrial prosperity e eastern United States largely depends.

ocky Mountain System.—The western highlands of North America, e Rocky Mountain system in general, is widest in latitude 40°; and e narrows to its end in the Alaskan range about latitude 63°, and to mination near the great Mexican volcanoes in latitude 18°. Its eastern lary is generally well defined by a sudden descent to the Great Plains. estern border touches the sea for nearly all its length. Within its here is a great variety of structure and form. The Selkirk Range, d by the Canadian Pacific Railway, and the broad St. Elias Alps in

Alaska, are truly Alpine in form, with great snow-fields and long gla
The Cascade Range in Washington and Oregon and the southern ran
Mexico are crowned with great volcanic cones. Extensive platea
horizontal structure are found in Arizona, Utah and New Mexico, be
dissected volcanic cones and lava flows on the uplands, and trench
deep canyons, of which that of the Colorado is the most famous.
lava plateaux occupy intermont basins in Idaho and Washington,
they are cut down in the canyons of the Columbia and Snake rivers
of the Snake being less known but hardly less marvellous than that
Colorado. Many ranges of moderate dimensions inclose inte
depressions that are now occupied by aggraded or waste-filled plains
plateau of Mexico being only an extensive development of these
between the eastern and western ranges of the Sierra Madre.

As is the rule among mountains, the individual ridges generally
from the erosion of valleys in broadly uplifted ranges, rather than
direct and local uplift. Many of the separate ridges of the Rocky M
tain ranges in Canada and Montana are thus produced ; the view
their summits disclosing a "sea of mountains," ridge following ridge
horizon, like waves on the ocean. The peaks frequently attain, but s
exceed, a height of 12,000 or 14,000 feet. Greater elevations are
in the far north-west where Mounts St. Elias and Logan e
18,000 feet on either side of the Alaskan boundary, and in the far
where the Mexican volcanoes rise above the snow line to simila
slightly less altitudes.

In certain parts of the western highlands, dislocation is
directly responsible for the existing relief of the land ; and th
well as the great general altitude of the region places it in s
contrast with the lesser eastern highlands. Certain of the mountain
and ranges are the immediate result of the uplift of the crust-blocks
initial form has not yet been wholly effaced by the carving of valleys or
flanks. The Sierra Nevada is, in a large way, a great tilted block, or
of blocks, the eastern face being short and steep, the western slope
long and relatively gentle ; both faces are now scored by deep v
through which the mountain waste is carried out to form the adj
plains. The lofty plateaux of Arizona are bounded by great cliff
edges of the huge plateau-blocks, that have been uplifted to alt
differing by a thousand feet or more, and now made rugge
gnawing streams. Further east, basins among the mountains of Colo
Wyoming and Montana, are the obverse of the ranges that have
uplifted around them, the basins being heavily aggraded with
mountain waste. It is believed that lakes occupied some of these
for a time, but that stage is now past ; the outflowing rivers
cut down the enclosing ranges in deep gorges, still so narrow as
impassable except to carefully constructed railroads. It is in the b
that most of the population gathers in the mountain region.

outh of latitude 18°, the mountains of Central America are largely anic, with little relation to the features of the Rocky Mountain system. ere ridges appear, they generally have east and west trends, and thus to be associated with the Antillean Mountain system, of which the ter part is submerged in the Caribbean Sea and made known only by dings as submarine ridges.

The Great Plains.—The Great Plains slope eastward from the base e Rocky Mountains. They are broadest between latitudes 35° and 55°. her north, they are narrowed by the convergence of the lacustrine on the east and the mountains on the west; further south, they merge the coastal plain of the Gulf of Mexico; beyond southern Texas their is measured only in tens of miles. Over their widest expanse they ent a vast surface of moderate yet varied relief. They are frequently rupted by embossed mesas and escarpments, or by incised valleys; ne name of "plains" is well applied, for the view from every little ence is almost as boundless as upon the sea. On the east, the plains e into the prairies; on the west they are interrupted by foot-hills and ing ridges near the base of the mountains. A mountain group in ota known as the Black Hills, named from the dark forests that n it, diversifies the treeless plains and introduces mining and ering in the midst of open cattle ranges. The Ouachita ridges extend- vestward from Arkansas, break in upon the plains about latitude 35°; er south they are known in Texas as the "Llano estacado" with bold agged escarpments on nearly all sides.

ike the vast plains of eastern Europe and western Asia, the Great s of North America stretch over so great a distance on the Earth's ex surface that they are more varied in climate than in form. Far , they are frozen and barren. Between latitudes 50° and 60°, they orested, the temperature here not being low enough to prevent tree th and not high enough to cause active evaporation and leave the ce arid. From 55° southward into Mexico, the plains are treeless for ost part, this being a direct result of their dryness, which in turn is lmost as largely to their summer warmth as to their light rainfall. exico and Yucatan, where the rainfall increases under the trade winds, owlands have a tropical flora of increasing richness southward; in ast to the mild climate of the plateaux, the narrow coastal plains are known as the "tierra caliente."

Climate.—The varied climates of North America afford many com- ions of the geometrical zones of temperature, wind, and rainfall, opriate to the globular form of the Earth, with the irregular or ary arrangement of these climatic factors caused by the non- etrical outline and relief of the lands.

onal arrangement is seen in the decrease of temperature and rainfall almost equatorial conditions at the Isthmus of Panama, to almost polar tions bordering the Arctic Sea. It is displayed with equal distinctness

in the easterly winds of the torrid belt that cover the peninsular
insular lands on the south, and in the stormy westerly winds that pr
over a broad belt of middle and higher latitudes. The irregular distr
tion of the climatic factors is seen in the far northward summer migra
of the heat equator to
deserts of Arizona and w
Mexico as compared with
moderate migration on
oceans, and in the great an
temperature range with
treme winter cold on
central plains of Canada
contrast to the moder
ranges prevailing over
oceans in similar latitu
It is found again in the p
tiful rainfall of the wes

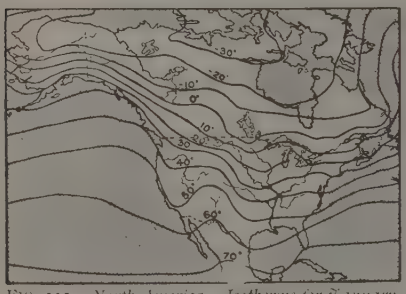


FIG. 331.—*North America. Isotherms for January.* (*After Buchan.*)

mountain slopes in temperate latitudes, while the intermont basins and
eastern slopes are dry, and in the abundant rainfall of the eastern slop
the trade wind belt, where the western slopes are relatively arid. Not
can be more striking than the contrast between the moderate chang
seasons along the Pacific coast from Alaska to California, and the vic
changes from winter to summer in the interior and along the mi
Atlantic border. These unlike conditions are dependent partly on
arrangement of ocean currents as guided by continental barriers,
partly on the distribution of temperatures by the prevailing winds.
British Islands have, under the benign influence of the North Atlantic c
the most abnormally mild climate for their latitude in the world; Labra
in the same latitude has one
of the most severe of climates.
It is a frozen and snow-
covered wilderness in winter;
it might have a comparatively
high mean temperature in
summer, but for the chill that
is received when the wind
blows inland from the cold ice-
laden current along its coast.

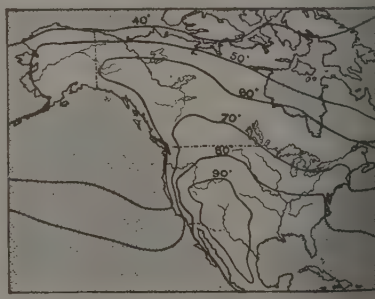


FIG. 332.—*North America. Isotherms for Ju* (*After Buchan.*)

Following upon these great interior changes of temperature, the prevailing winds exhibit something of a monsoon effect in certain regions. They frequently blow from the Gulf of Mexic the Mississippi valley in summer, and down the valley to the Gulf in wi Some indications of inflow and outflow may also be perceived in sum

d winter along the Arctic coast. There is furthermore a breaking of the nd belts merely from the occurrence of transverse land barriers. It is iefly on account of the obstacle formed by e western highlands that a branch of the evailing westerly winds turns towards e trades off the Pacific coast, especially in nter when the low continental tempera- e discourages the entrance of winds m the ocean. Similarly, the trades give th branches to the westerly winds east the Mexican highlands, especially in mmer when the high continental tempera- e persuades the winds to blow inland.

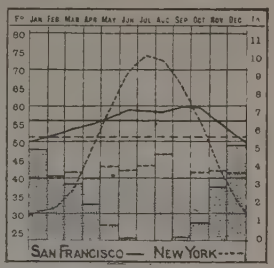
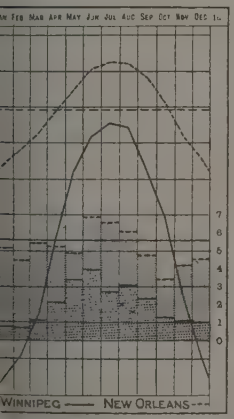


FIG. 333.—*Temperature and Rainfall Curves for San Francisco and New York.*

The ovals of high and low pressure, own as cyclonic and anticyclonic areas, ich so markedly characterise the westerly ds of temperate latitudes, are not only well developed as they drift across rth America, but they have been abundantly charted in the great series of cial weather maps for the United States and a bordering belt of Canada. ile the anticyclones are generally associated with fair weather, the lonic areas provide most of the heavy clouds and rainfall on their path. ring the passage of these atmospheric disturbances across the interior ins, they determine the strong changes of weather for which the region is noted; the vast extent of comparatively low open country permitting a free importation of air currents from frigid and torrid latitudes on either hand.



334.—*Temperature and Rainfall ves for Winnipeg and New leans.*

Rainfall and Vegetation.—While the extremes of temperature are the controlling climatic factors in determining the vegetable products and human industries between the far north and south, variation of rainfall exercises the most important climatic control across the great breadth of the continent in middle latitudes. A vast extent of country in the interior, shut off by the mountains from the moist winds of the Pacific, is too dry for ordinary processes of agriculture, unless resort is had to irrigation. Where most arid, the surface is a desert, although seldom so absolutely barren as the driest deserts of the Old World. Where a light rainfall ceived, a thin growth of grass that once supported vast herds of ns now gives scanty pasture to ranging cattle. Trees are wanting

over a great space of broad plains and intermont basins west of
100th meridian; but the mountain slopes are forested, especially
the Pacific is neared, the western descent of the Cascade Range be
densely occupied by trees
great size. East of the g
meridian, excepting for
prairies of the Mississi
and Winnipeg region,
the barren grounds of
far north, forests origin
covered the entire coun
for here the beneficent s
mergence under the Caribb
and Mexican Mediterrane
of what would otherwise
an American Sahara pern
a plentiful rainfall over
eastern part of the continent. When first explored, great tracts of fo
were found to have been devastated by fire. Although the forests h
now been extensively cut for timber and cleared for farming, the liv
trees at present are believed to be not greatly decreased below the num
that were growing at the time of first settlement.

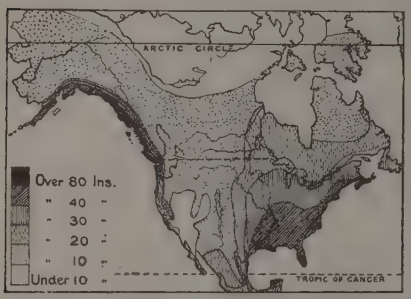


FIG. 335.—*The Mean Annual Rainfall of North America.* (*After Supan.*)

Aboriginal People.—Four hundred years ago, North America w
for the most part thinly populated by savage or barbarous peoples.
Mexico and Central America the inhabitants had developed an elabor
stone architecture, shown now in the temples whose ruins are often c
cealed under heavy forest growth. Further north, numerous earthwo
and fortifications mark the sites of pre-Columbian settlements, as in
Ohio basin; these are by some attributed to an extinct people; by othe
to the immediate ancestors of the wandering warlike tribes, to wh
a memorial of Columbus's faulty reckoning of longitude still clings
the name of "Indians." The early Americans had learned to do sim
weaving, to make rough pottery, to carve shells, to hammer the nat
copper of Lake Superior, and to chip flints and polish stone im
ments in the neolithic fashion. They seem to have had no horses wh
first discovered, but the tribes of the open prairies and plains beca
expert horsemen in later times. In the western desert interior th
are "pueblos," or villages, built for protection on isolated mesas, still oc
pied, and probably to be associated with the abandoned cliff dwelli
of the neighbouring canyon walls. On the north-west coast there
tribes remarkable for their fantastic wood carvings. In the far north
Eskimos are made torpid, as far as development goes, by the extr
rigour of their surroundings. Striking differences of language preva
among many of the tribes, especially those on the Pacific slope.

History.—The early discovery of North America by the way

and seems to be authenticated in the "Sagas," but no traces of previous
lements were found by later comers. The Columbian discovery sooner
ater led the Spaniards to found colonies from Florida southward, the
nch from Louisiana and Acadia (now Nova Scotia) northward, and the
ish along the middle Atlantic coast. Conquest, treaty and purchase
e now placed the Anglo-Saxon element in possession of the continent
n Mexico northward. The defeat of the French at Quebec in 1759
ght to the British crown all the St. Lawrence region except some small
claves" on or near Newfoundland. The last quarter of the eighteenth
ury witnessed the stormy separation of the Atlantic colonies from the
ted Kingdom, and their union in the first of the great modern republics
e United States. Purchase in 1803, when the Emperor Napoleon was
eed of money, brought Louisiana (the western basin of the Mississippi)
he United States, and
867 added the pre-
sly Russian territory
laska to the Republic.
ico and the other
ral American States
red their indepen-
ce from Spain in
first quarter of the
teenth century, and
ted republican forms
overnment (Fig. 350).
attempt to bring
ico again under Euro-
control, at a time
n the United States
distracted by civil

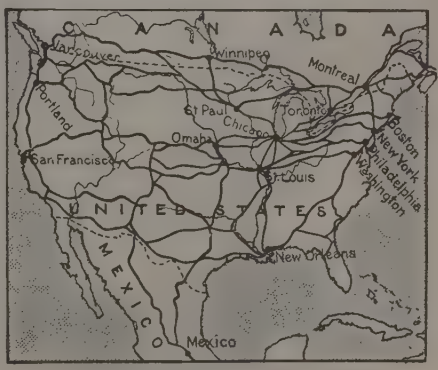


FIG. 330.—*Chief Railways of North America.*

fortunately met early failure. In the meantime, fed by a great number
European colonists, the several northern British colonies (except New-
dland) have united in the Dominion of Canada, which now stretches
the Atlantic and Pacific to the Arctic; the territory of the United States
been extended west to the Pacific, partly by exploration, partly at the
nse of Mexico; and, as a result of the war of 1898, Cuba has been
rated from Spain, and Porto Rico fallen to the share of the United
es as one of the first non-Continental possessions which the future
ns to have in store for it.

The rapidity with which the northern New World has been turned to
uses of civilisation is an appropriate consequence of the century of
n, electricity, and the wholesale production of steel. Railways and
graphs now unite the Pacific and Atlantic slopes of North America,
serve as political as well as commercial bonds between the east and
. Steamships and cables bring Europe and North America into the

closest relations as to people and commerce. Even so small a matter
getting the time by one's watch is now done in concert, not with
people of North America alone, but with those of western Europe
well, for the greater part of the northern New World is divided
"time belts," whose noon hour falls four, five, six, seven or eight ho
earlier than noon at Greenwich. Isolated villages in the backwoods p
still hold to the old-fashioned habit of keeping local time, but the lar
communities which use the railways as the basis of nearly all activi
adopt Atlantic, Eastern, Central, Mountain or Pacific time, according
their position.

STATISTICS.

THE COUNTRIES OF NORTH AMERICA.

	Area in square miles.	Population.
United States of America (including Alaska)	3,501,000	75,560,000
Dominion of Canada	3,300,000	5,370,000
Mexico	767,000	13,500,000
Newfoundland (and Labrador)	161,000	217,000

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CHAPTER XXXVIII.—COLONIAL NORTH AMERICA

I.—THE DOMINION OF CANADA

By J. B. Tyrrell, M.A., B.Sc.,
Formerly of the Geological Survey of Canada.

Position and Boundaries.—British North America, including under name Canada and Newfoundland, occupies the whole of the northern of the continent of North America, except Alaska, which belongs to United States. It lies between longitudes 53° and 141° W., and touches 42nd parallel on the south. The total area is rather over three and f million square miles, or slightly larger than the United States, including ka, and somewhat smaller than the whole of Europe. Its greatest th, on a line drawn from Cape Race, in Newfoundland, to Mount St. s, on the boundary of Alaska, is 3,400 miles.

ts only land boundary is with the United States, being separated from erritory of Alaska by the meridian of 141° W., and an undemarcated parallel to the Pacific coast. The southern frontier, 3,260 miles in th, passes through the straits of Juan de Fuca and Haro on the west, g the parallel of 49° N. to the Lake of the Woods, east of which it s a very irregular course, passes through the middle of Lakes Superior, on, Erie, and Ontario, then follows the highlands north of the State Maine, and finally turns southward to the mouth of the St. Croix river he Bay of Fundy.

Coasts.—The eastern continental shore extends from the mouth of St. Croix river in a very sinuous course northwards to Cape Chidley. Gulf of St. Lawrence, which is its most conspicuous and important rographic feature, is a pear-shaped sea 500 miles long, cut off from main Atlantic by the islands of Newfoundland and Cape Breton, receiving on the west the great river St. Lawrence. The islands Prince Edward and Anticosti lie within it. The northern coast of mainland extends from Cape Chidley to Demarcation Point, on the er of Alaska, north of which is the immense Arctic archipelago, slands for the most part being separated by rather shallow water. son Bay, which is a great indentation on this northern coast, is one ie most important physical features of the Dominion of Canada, ding, as it does, southward until it reaches to within 300 miles of the

north shore of Lake Superior. It thus divides the land-mass of Ca into two great parts, the smaller lying east and south-east, and the la west of its shores. It is an inland sea, 1,300 miles in its greatest le and 600 miles in maximum breadth, with an average depth in centre of 60 fathoms. Its water, except in James' Bay, is clear salt like the Atlantic, with which it is connected by Hudson Strait. Pacific Coast-line, beginning at the Strait of Juan de Fuca, runs n westward to the southern extremity of Alaska, a distance of 530 miles has an extremely irregular outline, on account of the many fjords off-lying islands.

Configuration and Geology.—The land-surface of Canada,

FIG. 337.—*The Geological Structure of Canada.*

in fact of the whole of the North American continent, has been buil around a great V-shaped area of Archæan rocks, which extends from northern and eastern shore of Labrador round the north of the G Lakes, and thence north-westward to the Arctic Sea. In the centre of V lies Hudson Bay, while around it are the fertile plains of eastern western Canada. This area, which has been called the Laure plateau, has a gently undulating rocky surface, in which the exi streams have nowhere cut deep valleys. In the depressions are considerable areas of fertile land, but as a rule the region cannot su a large agricultural population. The eastern and western borders of

tinent rise in two main systems of mountain chains, known respectively he Appalachian and Cordilleran systems, the former dying out in eastern ada and Newfoundland, while the latter, which forms the backbone the continent, runs to its highest summits in north-western Yukon, ere Mount St. Elias has an altitude of 18,010 feet, and Mount Logan a uted altitude of 19,500 feet. Between the Laurentian plateau and the palachian Mountains lies the fertile plain of the Great Lakes and the Lawrence valley, which as yet contains the larger portion of the pulation of Canada, while between the Laurentian plateau and the rdilleran chain lie the vast plains and prairies of western Canada. The ntry has been divided by the late Dr. G. M. Dawson into :—(1) *Eastern lands and hills*, almost entirely based on old and hard Palæozoic rocks. *The Laurentian plateau.* (3) *The inland plains*, principally based on the nparatively soft rocks of Mesozoic age, which still lie nearly as flat as en they were originally deposited. (4) *The Cordilleran or western untain region.*

Hydrography.—The mainland of Canada may be divided into four drographic basins.

(1) In the Atlantic basin the principal stream is the St. Lawrence, ich rises far in the interior of the continent, and after a course of oo miles, in which it chains the most magnificent series of fresh-ter lakes in the world, empties by a wide and deep estuary into the lf of St. Lawrence. Its basin has an area of half a million square miles. om Lake Erie, the Niagara river is broken by the Niagara Falls, ere the whole drainage of the four upper lakes plunges 167 feet over a cky ledge.

(2) The drainage basin of Hudson Bay is the largest in the Dominion, d into it converge streams flowing from the east, south, and west. Of ese the Saskatchewan-Nelson is the most important for length, drainage-ea, and the fertility of the land it drains.

(3) The principal stream in the Arctic drainage-area is the Mackenzie er, whose sources are mainly in the Rocky Mountains. The Finlay d Peace form the longest of the tributaries, though the Athabasca, rising ther south, is usually regarded as the main upper branch of the river. habasca, Great Slave and Great Bear Lakes—three of the largest of the ny great bodies of water which lie along the edge of the Laurentian ateau—are tributary to the Mackenzie.

(4) The Pacific area is in part drained by rapid streams which flow ore or less directly into the ocean, among which the Fraser is the ost important ; and in part by the Yukon which rises behind the Coast nge and flows more or less parallel with that range, northward through e Yukon district, and westward through Alaska, 644 miles being in nada.

Climate.—In so extensive a region the climate necessarily exhibits eat diversities, but for the most part it may be said to be continental.

Dr. G. M. Dawson divides the whole country into three climatic a
(1) The Eastern region characterised by great range of temperature
ample rainfall. This includes all the
provinces of Canada, with Newfoundl
and extends westward nearly to Winni
It is naturally the great forest re
(2) The Inland region, adjoining the
and stretching westward to within a
distance of the Pacific Coast. Thi
characterised by very great range
temperature and moderate rainfall.
includes the great prairies and
plains, but is also in large part
or less wooded. (3) The Pacific
region, which does not include
whole Pacific slope, but only a na
belt on the seaward side of the wes
mountain range of the Cordillera.
climate is oceanic, with small range
temperature, and great rainfall and humidity.

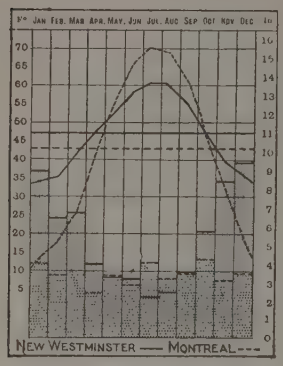

FIG. 338.—*Temperature and Rainfall of New Westminster and Montreal.*

The following table of mean temperature illustrates these climate

	Summer. (July, August, September.)	Winter. (January, February, March.)	Range be Mean Sur and Wi
Eastern.—Charlottetown, P.E.I.	61·9	19·8	42·1
,, St. John, N.B.	58·5	22·3	36·2
,, Halifax, N.S.	61·6	24·7	36·9
,, Montreal, Que.	64·8	17·1	47·7
,, Toronto, Ont.	64·1	24·6	39·5
Inland.—Winnipeg, Man.	59·7	1·5	58·2
Pacific.—Victoria, B.C.	57·0	41·0	16·0

Forests.—Speaking generally, British North America is a regio
forest, and east of Winnipeg almost all of the land which is now u
cultivation has been cleared of the heavy growth of timber which
covered it. Extending from the Atlantic to the Pacific, and with a w
of from 200 to 300 miles, is the vast sub-Arctic forest which is comp
largely of black and white spruce (*Abies nigra* and *A. alba*) and l
(*Larix Americana*). These trees have essentially the same northern li
the black spruce dwindling to a shrub before it disappears, while
others retain throughout their tree-like character. The northern limi
the forest, and the southern edge of the "Barren Lands" is not determi
by winter cold, or mean annual temperature, but is controlled entirel
the length and warmth of the summer; the northern limit of the fo
closely follows the line of a mean summer temperature of 50° F.

In eastern Canada this sub-Arctic forest merges on the south into a fo
of deciduous trees, characterised by the great number and variety o
species, there being sixty-five species in Ontario alone. In western Ca
the trees of the more southern forest continue chiefly coniferous in t

t on account of the moistness of the climate many attain to gigantic size. central Canada the coniferous forest is skirted by a belt fifty to a ndred miles wide of intermittent forest of aspen (*Populus tremuloides*), ıth of which are the open grassy plains, where the climate is too dry for growth of continuous woods.

Fauna.—One of the most interesting animals to be found on the con ent is the musk-ox (*Ovibos moschatus*), which lives, even in winter, on Barren Lands and on the Arctic islands. Barren-ground caribou *ıngifer grœnlandicus*) roam in great herds over the same plains in ımmer, but in winter most of them go south within the edge of the est. The five remaining species of deer, including the moose (*Alces ıericanus*), and the *waskasew*, or American elk (*Cervus Canadensis*) inhabit ferent parts of the woodland area to the south. Bison (*Bos Americanus*) merly ranged in countless herds over the plains and prairies east of the cky Mountains, but in the wild state they are now practically extinct. ong-horned antelope are still fairly numerous on the plains, and moun- ı sheep and mountain goats are to be found in most of the more ccessible parts of the Cordilleras. The sub-Arctic forest is the home of most important fur-bearing animals, including the beaver, bear (brown l black), marten, musk rat, otter, fisher, fox (black, red, and white), mink, x, skunk, and wolverine. Most of the birds are migratory, breeding ring the summer in the north, and going south as the winter sets in rhaps the most interesting bird is the Canada jay, or whiskey-jack *risorens Canadensis*), which lives throughout the year in the sub-Arctic est, and nests and hatches its young in February and March, during severe cold of the winter season. The coastal waters, rivers and lakes ound in fish, among which the most important are the cod, salmon, ring and whitefish.

People.—When the country was discovered by Europeans, it was cupied by a scattered native population, who were n called Indians. Their descendants are still ttered throughout the whole Dominion, those in the re thickly inhabited districts having adopted the bits and modes of life of the white people in the inity, while those in the more remote regions still e by hunting and fishing. The Indians now number out 100,000, or about one-fiftieth of the population. They are divided into a large number of tribes, hich belong to about ten or eleven distinct linguistic cks. Of these the *Algonkian* is much the largest d most important, for its people occupy the greater part of the sub- ctic forest from the Atlantic to the Rocky Mountains, and they are, *r excellence*, the fur hunters of Canada. They travel chiefly on the lakes l streams, the birch-bark canoe being their peculiar boat, and the birch- k tent, or wigwam, their home. The Crees, Ojibways, and Blackfoot

FIG. 339.—*Average population of a square mile of the Dominion of Canada.*

belong to this stock. North of them, to the edge of the Barren La between Hudson Bay and the Pacific, are the tribes of the Tinné stock, w are for the most part deer hunters. Further north the Eskimo, or Innu (Inŭwī), inhabit the whole northern coast from the Strait of Belle Isle Alaska, including parts of the shores of Hudson Bay. They are str and well-built, good hunters, endowed with remarkable perseverance, a capable of enduring great fatigue. They live chiefly on marine anim which they kill with a spear or harpoon, but there is also an inland tr on the banks of Kazan river, west of Hudson Bay, which subsist alm entirely on reindeer. The Iroquois were the ablest, both intellectually a physically, of all the North American Indians, and their Confedera known as the Six Nations, for a long time held the balance of pow between the early English and French settlers. They now live in settled parts of Ontario and Quebec. The Sioux, or Assiniboines, live the western interior plains, w the Haida, Kwakioor, Tsimshi Salish, and Kootenay live on coast or in the broken mountain districts of British Columbia.

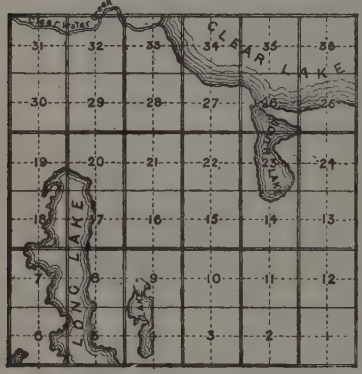

FIG. 340.—*A typical Township Plan of 36 square miles showing Sections and Quarter-sections.*

Of the population of Canada 1891, 86 per cent. were born Canada, and 10 per cent. in ot parts of the British Empire. these 29 per cent. speak Fren while almost all the rest sp English. Forty-one per cent. Roman Catholics, while most the remainder belong to vari Protestant denominations.

In the unoccupied parts of western provinces and territo land may be obtained either free or at a nominal cost by any one willin settle upon and work it. This land is held as the property of the Domi Government until allocated, and the Dominion Land Survey is char with surveying the unoccupied country and marking it out into rectang townships, each of six miles square divided by lines running north a south and east and west into thirty-six sections of one square mile ea Thus every piece of land is readily identified.

Internal Communications.—The great rivers and lakes of Can have furnished means of access from the coast to the interior from dates of the very earliest settlements. This is especially true of the Lawrence, which is navigable to Montreal for ocean-going steam drawing 27½ feet of water. Thence steamers can ascend to the h of Lake Superior, the obstructions in the rivers being overcome by c canals and fifty-four locks, which have a depth of fourteen feet or mo

e Saskatchewan and its branches are continuously navigable for amers of light draft for 1,200 miles ; the Mackenzie and its tributaries ve 4,300 miles of navigable waters, broken at only three places by rapids falls. In the Yukon basin there are about 2,600 miles of continuous vigation.

An extensive system of railways now unites the Atlantic to the Pacific ean, serving the whole of the settled part of the country and opening up ich of the interior to settlement. The total length of these railways in 02 was 18,714 miles (see Fig. 336), and large schemes of railway extension ve been proposed.

Government.—The Dominion of Canada is a federation of self-erning colonies associated for common affairs. The Dominion vernment consists of (1) a Governor-General appointed by the British vernment to represent the Crown for a term of five years ; (2) a Senate 81 members appointed by the Crown (on the advice of the Privy Council Canada) for life ; (3) a House of Commons of 213 mbers, elected for five years on a very liberal fran-se, liable to be dissolved by the Governor-General the advice of the Ministry ; (4) an Executive nistry composed of 13 or more members, having ts in the two Houses of Parliament, and holding ce only so long as it has the support of the majority the members of the House of Commons ; (5) a minion Judiciary composed of six judges, acting as Court of Appeal from all the provincial courts, ugh its decisions are subject to review on appeal the Judicial Committee of the Queen's Privy Council in London.

FIG. 341. — *Armorial Bearings of the Dominion of Canada.*

In each of the provinces there is a Lieutenant-Governor, appointed by Governor-General in Council for a term of five years ; a Legislative embly composed of members elected for terms of four or five years ; l also in Nova Scotia and Quebec a Legislative Council or upper house pointed by the Lieutenant-Governor in Council for life. There is also Executive Council of from 5 to 12 members, who hold office as long as y are supported by a majority in the popular Assembly. A Judiciary ach of the provinces is appointed by the Governor-General in Council. sides these there are in most of the provinces municipal or local ncils, who have the control of their local affairs, and have the power to for the support of schools and the prosecution of public works of a al character.

NOVA SCOTIA

Position and Coasts.—Nova Scotia, the most south-easterly pro-ce of the Dominion of Canada, consists of a long and rather narrow insula, extending in a south-west and north-east direction, and the ge island of Cape Breton, lying off its north-eastern end. It lies

between 59½° and 66° W. long., and 43½° and 47° N. lat., being thus in same latitude as Switzerland and the south of France. Near the mi of its north-western side it is connected with New Brunswick b isthmus which at one point is only 16 miles in width.

The south-western portion of the peninsula has the Bay of Fundy Chignecto Bay on the south, while the north-eastern end of the peni and Cape Breton Island are bounded on the north by Northumber Strait and the Gulf of St. Lawrence. The Gut of Canso, only a mile a half in width at its narrowest part, separates Cape Breton Island f the mainland, and the island itself is almost divided by an arm of the known as Great Bras d'Or. The Atlantic coast is bold and rocky, an indented by many bays, almost all of which furnish safe anchorage for largest ships. On the southern shore of the Bay of Fundy the coa much less broken, and the northern shore forms a moderately regular c from Bay Verte round the north point of Cape Breton. Pictou Harb is the most important of the several good harbours on the north coast.

Along the southern coast of the province, where the waves of Atlantic Ocean have carved the shore into very irregular shapes, there many small rocky islands. Sable Island lies 85 miles out in the c Atlantic. It is a chain of sand dunes, 20 miles long and a mile w resting on a more elevated part of the submarine banks, and formin great danger to shipping. Lighthouse and life-boat men are the inhabitants.

Configuration.—The surface of the province is rather irregu being formed of ridges, often diffuse and indefinite, which run more less parallel to the long axis of the peninsula, and intervening plains valleys. These ridges, which nowhere rise more than 1,200 feet ab the sea, are formed, like those of Newfoundland, by the outcrops harder rocks. The highest range, known as the Cobequid Mountains, r from the Bay of Fundy eastward to the Gut of Canso. A high b ridge of trap, known as North Mountains, forms the southern shore the Bay of Fundy, extending from Brier Island to Cape Blomidon, the south side of which, underlain by Triassic sandstone, is the Annap valley, the garden of the province. Farther south, where the country underlain by Cambrian schists, quartzites, and intrusive granites, agricult land is mainly confined to the river valleys.

Climate.—The climate of this and the adjoining provinces of N Brunswick and Prince Edward Island is more humid and much m variable than that of central Canada, and fogs are common along northern and eastern coasts, where the cold Arctic currents hug the sh

People and Industries.—Nova Scotia was probably the land covered by Lief Ericsen, the Northman, in A.D. 1000, and it was re covered by Cabot in 1498, shortly after which its shores and harbours w resorted to by French and Portuguese fishermen. In 1605 the Fr founded the first European settlement on the shores of Annapolis basin, a

the next century, until the Peace of Utrecht was signed between France the United Kingdom, Acadia (French, Acadie) remained in the hands the French; then under the name of Nova Scotia it became a British ony and entered the Dominion of Canada on its formation. Most of present population have been born in the province, but their ancestors re immigrants from different parts of Great Britain. Living within the nd of the sea, and near a coast indented with many good harbours, y naturally turn to the ocean for their means of subsistence. The eries therefore, especially of cod and lobsters, form the most important ustry in the province. More than 14,000 boats and vessels and 27,000 n are engaged in this industry.

In the northern part of the province coal mines are extensively worked, total amount raised in 1901 being 4,200,000 tons, while in the southern tion of the province gold is mined. Iron and gypsum are the other ef mineral products.

Halifax, the capital, is situated about the middle of the south-east coast, a magnificent natural harbour, the nearest to Europe on this continent t is open and free of ice all the year round. It is an important coaling ion for the British fleet, and is strongly fortified and garrisoned by perial troops.

PRINCE EDWARD ISLAND

Position and Surface.—Prince Edward Island, the smallest province he Dominion of Canada, lies within the Gulf of St. Lawrence, between tude 46° and 47° N., being separated from New Brunswick and Nova tia by Northumberland Strait which is only ten miles wide at its rowest point. The island is 145 miles long, with a breadth of from 5 to miles. Its coast is very irregular, projecting in long low points, and cut deep bays, many of which have bars of sand stretching across them, ugh these bars are usually broken through sufficiently to allow vessels ight draught to enter. The island is underlain by soft red sandstones Permo-Carboniferous and Triassic age, which weather down readily evenly, and on this account the surface is without strongly marked minences and nowhere rises more than 500 feet above the sea.

Resources and People.—The soil, like the underlying rock, is red colour, and is very fertile, so that agriculture occupies the attention the people to a large extent. Potatoes and oats are the chief products, cheese and butter are also now becoming important. Many fine ses are also reared. Next to agriculture fishing is the chief industry, lobster-fishing being the most important, while the oyster-beds furnish re than half the oysters collected in Canada. The province is the st thickly peopled in the Dominion, the average density being 54 to the are mile. The people are mostly native born, but about half are of ttish descent. The province joined the Dominion in 1873. *Charlotte-n*, the capital, is situated on an excellent harbour on the south coast.

NEW BRUNSWICK

Position and Surface.—New Brunswick is roughly rectangula shape with a greatest length from north to south of 205 miles. Exclu of islands it lies between 45° and 48° N., being thus in the same latitud central France, or southern Hungary. It has land boundaries with province of Quebec on the north, the State of Maine on the west, the province of Nova Scotia at the isthmus of Chignecto in the east. coasts face the Gulf of St. Lawrence and the Bay of Fundy. There many good harbours, though the east coast is for the most part low, outlying sandy shoals. Bay Chaleur, to the north, is 85 miles long, free of rock and shoals, while the Bay of Fundy on the south is note having the highest tides in the world, the spring tides at the head of bay rising 50 feet.

The central tract, underlain by rocks of Carboniferous age, low-lying plain, seldom rising more than a few hundred feet above sea, and sloping gently towards the east coast. Both it, and muc the higher country in the north-west portion of the province, under by Silurian rocks, are well adapted for agriculture, but as yet only a s portion is cultivated. The country underlain by disturbed and alt crystalline and Cambrian rocks along the south coast, and stretc diagonally north-eastward through the province, is much more rugged broken, the latter belt rising into numerous high peaks ; Bald Moun the highest, reaches 2,470 feet. The whole country, both highlands lowlands, is almost everywhere covered with a forest of spruce (*Picea a*

Rivers.—New Brunswick is a land of many and beautiful ri which flow either southward into the Bay of Fundy or eastward into Gulf of St. Lawrence ; several of them are navigable by river steam The St. John, 450 miles long, rises in the State of Maine, and at its m it flows through a rocky gap only 400 feet in width, where, at ebb there is a heavy fall towards the harbour, while at flood tide there is a in the opposite direction. Four times a day, at half tide, ships can in or out through the narrow gap. Above this reversible fall the riv navigable for river craft for 212 miles to Grand Falls.

People and Resources.—The province was originally settled by French, but the present inhabitants are chiefly descendants of Br emigrants. Hitherto the forests have been the chief sources of wealt the people. Pine was formerly abundant, but has now become very sca the forests being almost entirely composed of spruce. Only the la trees are cut, while the smaller ones are carefully preserved, so in this way any district can be economically "cut over" every te fifteen years. Fishing is the industry of second importance, though chiefly carried out along the shore, but few vessels being engaged in d sea fishing. A considerable number of people are engaged in agricul all the ordinary products of temperate climates being produced.

Towns.—*St. John*, the largest and most important commercial city the province, is situated on a rocky peninsula where the St. John ver flows into the Bay of Fundy. It has an excellent harbour, open the year round, for in winter it is kept clear of ice by the tides, which re rise 25 feet. It is thus busy in winter when the St. Lawrence is ozen. In the days of wooden ships St. John was a famous ship-building wn, and even now a very large number of vessels are owned in the y. *Fredericton*, the capital of the province, is situated on the St. John ver, 86 miles from its mouth, and the tide ascends the river to a short stance above it. *Moncton*, on the Petitcodiac river, is a considerable anufacturing centre.

QUEBEC

Position and Boundaries.—The province of Quebec lies between ° and 79½° W., and between 45° and 53° N. It is bounded on the est by the province of Ontario and a short section of the east coast of udson Bay; on the south by the States of New York, Vermont, New ampshire, and Maine, and the province of New Brunswick; on the east the Gulf of St. Lawrence and that portion of Labrador attached to New-undland; and on the north by the district of Ungava. Its total area is out one-sixth less than the combined areas of France and Germany.

Its coast line, with the exception of 100 miles on Hudson Bay, is entirely nfined to the Gulf and Estuary of the St. Lawrence. The north shore, om the Strait of Belle Isle westward, is bold, rocky, and quite bare of ees as far as Cape Whittle, beyond which it becomes slightly lower; trees pear in some of the valleys, and in a few places small patches of land ve been brought under cultivation. Close to the shore are many bare cky islands. The south shore of the estuary is formed of bold, rocky lls, most of which are covered with forest.

Of the islands included in the province the Magdalens, a cluster of cky knolls, often connected by bars of sand, very dangerous to shipping, e in the centre of the southern half of the Gulf of St. Lawrence. nticosti, which lies in the mouth of the estuary of the St. Lawrence, is o miles long, but has no good harbours, and is almost uninhabited.

Configuration.—The province is naturally divided into three parts.

(1) The Laurentian Plateau is an undulating rocky country north the St. Lawrence, lying between 500 and 2,000 feet above the sea, iefly underlain by granites, gneisses, and other rocks of Laurentian e, while here and there are areas underlain by highly altered sediments Huronian age. In the vicinity of lakes St. John and Mistassini all outliers of comparatively unaltered Cambrian and Silurian rocks are o included. The region has all been severely glaciated and there is le residuary soil remaining anywhere. The summits of the low, nded hills are bare, while the depressions are either occupied by gular lakes of beautifully clear water, or are filled with stony clay,

which is usually covered with a scattered and stunted forest of spruce a larch, and a deep bed of moss. On the better-drained land, along streams and lakes there are often extensive forests of large pine and spru Seen from the valley of the St. Lawrence the edge of this plateau has appearance of a range of low rounded mountains, to which the na Laurentide Mountains has been applied. Among the highest points Les Eboulements, 2,547 feet, and Trembling Mountain, 2,380 feet.

The streams flowing from the small lakes form a succession of qu lake-like reaches of water separated by short, rapid *chûtes* or falls. T feature, which is characteristic of most of the streams throughout great Archæan continental nucleus, has rendered it possible to travel v extensively in canoes or small boats, which with their cargoes may carried on "portages" over narrow rocky ridges, and past intervening fa Most of the streams flowing southward to the St. Lawrence are of t type until they reach the edge of the plateau, or "Fall line," where th plunge in one or more heavy falls to the plains below. Montmorency F near Quebec, 224 feet high, is a fine example of these cataracts.

(2) The St. Lawrence Plain has an area within the province of ab 10,000 square miles. It is a long and comparatively narrow belt betw the foot of the Laurentian Plateau and the highlands south of the ri Beginning a short distance below the city of Quebec it gradually rises, u at the west end of the province, it has a maximum elevation of between and 400 feet above the sea. It is underlain by more or less flat-lying S rian limestones and sandstones. Towards the close of the Glacial Epo when the land was much lower than it is at present, the estuary of the Lawrence extended far beyond the site of the present city of Montreal, a varying thickness of sand and clay was deposited in it. Since the la has been again uplifted these sands and clays form the fertile soil on wh the agricultural prosperity of the province depends. On this plain a f hills of trappæan rock, such as Mount Royal behind Montreal, rise ab the general level.

(3) The Highlands south of the St. Lawrence form the northern c tinuation of the Appalachian Chain which extends northward through eastern United States. They are known as the Notre-Dame Mountain the southern portion of the province, and the Shickshocks in the Ga peninsula, the highest points in the latter portion of the range risin nearly 4,000 feet. They are formed of parallel ridges of rock, usu standing at high angles, and varying in age from Archæan up to Devon Much of the country is thickly forested. South of the St. Lawrence, la are not numerous and all the principal streams run in the moderately i country beyond the Notre-Dame and Shickshock Mountains and fl northward through these mountains in deep, narrow channels.

Climate.—The climate is continental. The winters are clear, w a mean temperature of 14° F., while the summers are warm and brig with a mean temperature of 60° F. The average precipitation is ab

36 inches per annum. In the southern portion of the province all the ordinary cereals usually grown in temperate climates come to perfection.

History and People.—The discovery of Quebec dates from 1534, when Jacques Cartier entered the St. Lawrence river, but it was not until 1608, when the city of Quebec was founded as a fur-trading station, that any successful attempt was made at settlement. From that time onwards for a century and a half, settlers from France spread over the country, most of whom were engaged in the double occupation of collecting rich furs from the Indian hunters, and clearing and tilling the fertile soil. In 1760, during the Seven Years' War, the country fell into the hands of the British through the capture of Quebec by Wolfe. In 1774 the French, who at that time numbered 70,000, were assured by the "Quebec Act" the right to be governed by their own civil laws, which right they still enjoy. Eighty-five per cent. of the people of Quebec province are of French race and Roman Catholic religion, and the French language is used officially as well as English.

Resources.—Most of the population are engaged in agriculture; oats, barley, wheat, maize, hay and tobacco are the chief products, while fruits, such as apples, pears and plums, are extensively grown. Horses and cattle are also raised in large numbers, and much attention is paid to the making of cheese and butter. The timber industry is next in importance to agriculture, white pine, spruce and larch being the principal woods brought into the market. Fishing is important in the Gulf of St. Lawrence. Gold is found in alluvial deposits on the Chaudière river. Asbestos is largely mined in the country south of the St. Lawrence, while copper, iron, mica and graphite are also worked to some extent.

Towns.—*Montreal*, founded in 1642, is situated on an island at the junction of the Ottawa and the St. Lawrence rivers at the head of ocean navigation, any vessel that can enter the harbour of New York or Boston being able to steam up to its wharves. The extensive system of inland navigation, which reaches into the very heart of the continent, begins above the city, and the St. Lawrence is crossed by its first bridge. It is the principal seaport, and the largest city in the Dominion, and is the main eastern terminus of the Grand Trunk and Canadian Pacific railways. It is an important manufacturing centre. The population is more than half of French extraction.

FIG. 342.—*Site of Montreal.*

Quebec, one of the oldest cities on the continent, was founded by Champlain in 1608. The present city is situated partly on a bold promontory on the north side of the St. Lawrence, and partly at the foot of the cliffs close to the river bank. In front of it is a magnificent basin, in which the largest ships afloat can ride in safety. It is the capital of the province, has beautiful parliament buildings, an important Roman Catholic university, and its citadel, situated on the summit of the rocky cliff overlooking the river, has often been spoken of as the "Gibraltar of America." The population is mostly of French descent, and French is more spoken than English. *Hull*, on the Ottawa river, and *Sherbrooke*, near Montreal but south of the St. Lawrence, are also thriving manufacturing towns.

FIG. 343.—*Site of Quebec.*

ONTARIO

Position and Boundaries.—The province of Ontario lies between 42° and 52° N., and 74° and 95° W. It is bounded on the south and south-west by the States of New York, Michigan, and Minnesota; on the east by the province of Quebec, and on the north and north-west by the district of Keewatin. Its total area is somewhat larger than either France or Germany, and its greatest length from east to west is about 1,000 miles.

The province lies almost entirely inland, for the only place where it reaches the sea is on the shallow coast of Hudson Bay, with no harbours that will accommodate large ocean-going vessels. But most of its southern border lies along the Great Lakes, which, with their connecting rivers, give it a shore line, accessible for about eight months of the year, of 1,700 miles. The steamer traffic on the great lakes may be judged from the fact that a greater tonnage passes through the "Soo" canals, which avoid the rapids at Sault St. Marie between Lake Huron and Lake Superior, than through the Suez Canal. The Canadian shores of Lakes Ontario, Erie, and part of Huron are low and moderately regular. The northern shore of Lake Huron lies along the edge of the Laurentian Plateau, and is fringed

FIG. 344.—*The "Soo" Canals.*

with a vast number of small rocky islands ; the northern shore of Lake Superior is very bold, with deep bays and comparatively few islands, all of which are rugged and picturesque.

Configuration.—The surface contour is but slightly accentuated, most of it being less than 1,200 feet above the sea, while very few, if any, points rise to a height of 2,000 feet. It is divided naturally into four main subdivisions. (1) A relatively small area sloping gently northward towards Hudson Bay, and underlain by flat-lying Silurian and Devonian limestones. This is very largely covered with swamp or morass, and much of it is thinly wooded with small spruce and larch. Except a few fur-traders and missionaries it has no white inhabitants. (2) The Laurentian Plateau, a continuation westward of the same region in the province of Quebec, forms by far the largest part of the province, though most of it is yet a wilderness. It is almost entirely underlain by Laurentian and Huronian rocks intricately folded and squeezed together, the former being essentially granitic in type. The Huronian rocks consist of sandstones and clays associated with traps and other igneous and intrusive rocks, and are of especial importance on account of the rich minerals associated with them. Where the character of the rock varies greatly within comparatively short distances, as near the north shore of Lake Superior, there are high hills and deep valleys, but in other places the surface is mamillated with many low rounded hills and shallow rock-bound basins filled with clear water or mossy swamps. Usually the summits of the hills are almost naked rock, supporting but a stunted forest growth, the valuable forests of spruce and pine being confined to the richer and moderately well-drained valleys ; but near the great lakes the rock is often covered by extensive deposits of sand and clay, laid down in the beds of these lakes when, towards the close of the Glacial Epoch, their waters stood at much higher levels than at present, and on these lacustral deposits grow some of the finest pine forests in Canada. The southern end of the Laurentian Plateau crosses the Ottawa river at the Chats Rapids and strikes southwards to the Thousand Islands on the St. Lawrence. (3) East of this boundary comes the western extension of the St. Lawrence Plain underlain by flat-lying Cambro-Silurian rocks, over most of which is a Pleistocene deposit of marine sands and clays. As yet it is not very thickly settled except along the banks of the rivers. (4) From the Thousand Islands the southern edge of the Laurentian Plateau strikes westward to Matchedash Bay, at the south-eastern extremity of Georgian Bay, and south of this line is the district known as the Ontario peninsula which is the most fertile and thickly peopled portion of Canada. It is underlain by flat-lying Silurian and Devonian rocks, chiefly limestones, over which there is almost everywhere spread a covering of till or glacial detritus from the old northern ice-sheets ; this till forms some of the richest soil to be found on the continent. In places the till is again overlaid by lacustral deposits formed in the beds of the great post-glacial lakes. This district is divided by

the Niagara escarpment, a bold cliff of Silurian shales and limestones which crosses the Niagara river at Queenston, skirts the south shore of Lake Ontario to Hamilton, and thence strikes northward to the Bruce Peninsula, between Lake Huron and Georgian Bay, finally forming the backbone of Manitoulin Island in Lake Huron.

Smaller Lakes and Rivers.—Lake Nipigon, with an area of 1,458 square miles, is probably the largest of the many lakes occupying depressions in the Laurentian Plateau, while the Lake of the Woods (Fig. 47), on the extreme western edge of the province, is of about equal size. Along the edge of the Laurentian Plateau a narrow chain of lakes has been formed, among which are those of Balsam and Scugog. In the Ontario peninsula, north of the Niagara escarpment, there are a few very picturesque lakes, Lake Simcoe being the largest, and well known as a summer resort.

The streams of Ontario province belong to three different drainage areas—(1) those flowing southward into the great lakes; (2) northward into Hudson Bay, these being the longest in the province; and (3) westward into Lake Winnipeg.

History and Resources.—Ontario was first settled in 1776, after the close of the American Revolution, by United Empire Loyalists, men who had left the United States, and their property there, for the love of the United Kingdom and British institutions. That patriotism was strengthened in 1812 when the armies of the United States invaded the country and were repulsed on every side after heavy loss. In 1791 the district was erected into a province, and since that time the population has grown quietly, mainly in the peninsula. Four-fifths of the inhabitants are Canadian born.

A large number are engaged in agriculture, farming being the most important industry in the province. Wheat, oats, barley, maize, potatoes and hay are the principal crops. Stock-raising is also extensively carried on, and wool is of some importance. Cheese-making and dairying are also great and growing industries. Fruit is extensively grown, the principal kinds being apples, pears, peaches, plums and grapes. The chief fruit districts are in the peninsula near the shores of the great lakes. Lumbering is next in importance to agriculture, the timber-lands being leased for this purpose by the Government to private companies or individuals. The fisheries are confined to the great lakes where about 3,000 men are employed.

With the exception of petroleum, the mineral industries of the province are yet in their infancy. Nickel ores occur in extensive deposits near Sudbury on the line of the Canadian Pacific Railway, and an almost unlimited supply of the metal could be obtained if there were a sufficient demand. Copper is usually associated with the nickel in these ores. Gold is found in the Huronian rocks of the western portion of the province, and it is not improbable that many rich gold mines will soon be worked there.

Natural gas exists at several places in the southern portion of the peninsula Salt and gypsum are also produced in considerable quantity.

Towns.—*Ottawa*, the capital of the Dominion, is beautifully situated on the south bank of the Ottawa river just below the Chaudière Falls. The Dominion Government buildings are of imposing character and finely situated. Ottawa has the most important lumber interests of any city in Canada. Several railways pass through it, and the Rideau Canal joins it to Kingston on Lake Ontario. *Toronto* is both the commercial and political capital of the province. It is built on a series of low terraces on the north shore of Lake Ontario between the mouths of the Don and Humber rivers, and in front of it is an excellent harbour about 3¼ square miles in extent, formed by a long sandy island which projects westward from the foot of the cliffs at Scarboro' Heights. It was founded by Governor Simcoe in 1793, on the site of an old French fort that had been built forty-four years before. It is the seat of numerous manufactories, several large industrial institutions, and being an important railway terminus is the principal distributing centre of the province. It is also a banking centre, many of the largest financial institutions in the Dominion making it their headquarters. *Hamilton*, situated at the head of a sheltered bay at the west end of Lake Ontario, is a manufacturing town. *London* is situated on the Thames river, in the centre of one of the finest farming districts in the province. *Kingston*, at the east end of Lake Ontario, is the oldest city in the province, and besides other educational institutions it contains a military college.

MANITOBA

Position and Surface.—The province of Manitoba lies in the very centre of the continent, being almost equidistant from the Atlantic and Pacific coasts, and from the Arctic Sea and the Gulf of Mexico. In outline it is almost square, with sides about 270 miles in length. It extends along the 49th parallel of latitude, which is here the boundary with the United States (Minnesota and North Dakota) from the Lake of the Woods westward to the meridian of 101°, which forms the western boundary. On the east it is bordered by Ontario, and the North-West Territories lie on the north and west.

The province falls naturally into three principal divisions, running in a general north-westerly and south-easterly direction. (1) The Laurentian Plateau, which lies east of the east shore of Lake Winnipeg, with its characteristic undulating rocky surface, dotted with small lakes, and traversed by many crooked, irregular streams. It is chiefly underlain by Laurentian rocks of granitic type. (2) The Lacustral Plain, or First Prairie Steppe, which includes rather more than half of the province, occupies part of the basin of an ancient glacial or post-glacial lake, which has been called Lake Agassiz. The thick beds of clay and silt deposited in that lake now form the rich wheat-producing soil of the

Red River valley. It is almost entirely underlain by flat-lying Silurian and Devonian limestones, and in its southern portion the original inequalities of the rocky surface have been almost entirely levelled up by the lacustral deposits, while further north the rocky surface was more irregular, and was not so completely covered with clay, having long wide ridges and hollows, the most important of the latter being now occupied by Lakes Winnipeg, Winnipegosis, and Manitoba. Much of the country south of these lakes is open grassy prairie, while farther north it is more or less thickly wooded with spruce and poplar. (3) The Manitoba Escarpment borders the lacustral plain on the west, rising from 800 to 1,400 feet above the plain at its base. West of this escarpment comes the Second Prairie Steppe, in which the relief is more strongly pronounced, the rivers often flowing in valleys which they have cut to a depth of several hundred feet, while many of the stony hills are rough and steep. Much of the soil is of excellent quality, and in the southern portion of the province will grow large crops of wheat; further north and on the higher tracts abundant crops of oats, barley, and the more hardy cereals and roots can be grown. This plateau is underlain by soft shales and sandstones of Cretaceous age.

Winnipeg river, a large stream, broken up by many rapids and falls, flows into Lake Winnipeg from the Laurentian plateau on the east. The Red River of the North rises in the United States and flows northward to empty into the south end of the same lake, while its tributary, the Assiniboine, drains much of the western portion of the province.

History and Towns.—The retired employés and dependents of the North-West and Hudson's Bay Fur-trading Companies formed the nucleus of the present population of the province, originally called the "Red River Settlement." In 1870 the population was about 12,000, while in 1901 it had risen to 255,000. Almost all the inhabitants, who include many immigrants from the United States as well as from Europe, derive their support, directly or indirectly, from agriculture. The principal crops are wheat, oats, barley, potatoes and flax, and of these the exports consist mainly of wheat, the arrangements for collecting and transporting which are highly organised. In the more northern parts of the province many farmers devote themselves to raising cattle, and to the making of cheese and butter. White-fish of the finest quality are caught in the large lakes of the province, and of late years the fishing industry has assumed considerable proportions.

Winnipeg, the capital, and chief city of the province, is situated on the level lacustral plain, at the confluence of the Red and Assiniboine rivers. It is the distributing point and commercial focus of the whole of the Canadian North-West, one of the most important stations on the Canadian Pacific Railway, and a railway centre for lines from the United States as well. *Brandon* and *Portage la Prairie* are prosperous towns in the centre of rich wheat-growing districts on the Canadian Pacific line.

BRITISH COLUMBIA

Position and Area.—British Columbia, stretching from the Rocky Mountains to the sea, is the largest province in the Dominion, having an area three times as large as the United Kingdom. Its greatest length, measured in a north-westerly direction, is 1,250 miles. It is bounded on the south by the United States, the parallel of 49° separating it from Montana, Idaho and Washington. On the west the Pacific Ocean, and farther north a narrow strip of the United States territory of Alaska, are the boundaries. On the east and north it is bordered by the North-West Territories, which separate it from the eastern provinces.

Coasts.—Viewed as a whole the coast has a general trend in a north-westerly direction, but in detail it is very irregular, reaching back into deep, narrow fjords, and fringed by a maze of islands of all sizes. The fjords and straits are submerged valleys both in line with and transverse to the general direction of the mountain ranges. Of the fjords, Dr. G. M. Dawson writes: "Their width is usually from one to three miles, their shores rocky and abrupt, and rising towards the heads of the longer fjords into mountains from 6,000 to 8,000 feet in height. The water is deep, usually much too deep for anchorage, but at the head of each arm a delta-flat, formed by an entering river, is commonly found. Many good harbours exist along the coast, but the two best and most important of those on the mainland are Burrard Inlet, upon which the city of Vancouver is built, and Port Simpson, near the northern end of the coast of the province."

Vancouver Island is separated from the mainland by the Strait of Juan de Fuca on the south, and the Strait of Georgia and Queen Charlotte Sound on the north-east, these two being connected by narrow channels which at Seymour Narrows are less than half a mile in width. It has a length of 285 miles, and a greatest width of 80 miles.

Mountains.—British Columbia is essentially a country of mountains. In the portion of the province north of latitude 54°, the breadth of the Cordillera or mountain belt, from south-west to north-east, is about 400 miles. The mountains, as a rule, run in a north-westerly and south-westerly direction, and the two most conspicuous and important ranges run along opposite sides of the rhomb, the Rocky Mountains proper along the eastern side, and the Coast Range along its western side. At the international boundary the Rocky Mountains have an average width of about 60 miles, and many of the peaks reach heights of 10,000 feet, being snow-capped and abounding in fine glaciers. Further north the range decreases both in width and height, until in the vicinity of Peace river, in latitude 56°, it is only 20 miles wide, and but few of its peaks rise above 5,000 or 6,000 feet. This range is composed of stratified limestone, quartzites, and other rocks from Cambrian to Cretaceous; granites and other crystalline rocks are almost entirely absent. The Rocky Mountain range is bounded on the west by the great Columbia-

Kootenay valley, which in its course north-westward is occupied successively by the upper portions of the Kootenay, Columbia, Fraser, Parsnip, Findlay, and other rivers, which usually break through its western border to the sea. South-west of this great valley are the Selkirk and Gold ranges. The gold and silver recently discovered in southern British Columbia occur in these mountains. Between the Gold and the Coast ranges, the interior plateau attains an average width of 100 miles. To the south, it does not much exceed, on the average, a height of 3,000 feet, but it gradually decreases to 2,000 about latitude 54°, beyond which it is cut off by transverse ranges of mountains. In places it is so deeply dissected by streams and atmospheric agencies that it has lost all semblance of a plain, but in other places there are extensive almost level tracts, among which is much land suitable for ranching and agriculture.

The Coast Range begins about latitude 49°, and runs north-westward, near the coast, for about 900 miles, with an average width of about 100 miles. Many of its summits rise to heights of 7,000 and 8,000 feet, while its submerged valleys form deep fjords. Its seaward slopes, clothed with magnificent forests, rising to snow-capped peaks form some of the grandest scenery in the world. The mountains forming the backbone of Vancouver and Queen Charlotte islands are a subsidiary and partly submerged chain of the main range. The Coast Range is chiefly composed of granitic and highly altered sedimentary rocks.

Hydrography.—In conformity with the structural lines of the country, the numerous lakes are long and narrow, lying either between the mountain ranges, or in the bottoms of the deeper parts of river valleys, which have been obstructed in some way. The Peace and Liard rivers rise in the north-eastern part of the province, and drain a large area eastward into the Mackenzie river. A small area in the extreme northern portion is drained by the headwaters of the Yukon. The remaining rivers flow towards the Pacific coast in very irregular channels, running between and across the ranges, and often doubling back parallel to their upper courses. Of these the principal is the Fraser, which rises on the western slopes of the Rocky Mountains, close to the source of the Athabasca, and flows at first north-westward, and then southward, to empty into the Strait of Georgia, having a total length of about 750 miles. The upper waters of the Columbia river flow through the province, the river being twice crossed by the Canadian Pacific Railway. The Skeena and the Stikine are both large rivers, navigable for small steamers in their lower courses.

Climate.—The climate varies from temperate insular on the coast and islands, to extreme continental on the high interior uplands. The total annual precipitation in the valleys of the interior is about 15 inches; at Victoria it is 40 inches, while in some parts of the coast to the north it exceeds 100 inches. It is thus, in some parts of the interior, possible to grow crops only with the aid of irrigation, while along portions

e coast the excessive humidity practically precludes agriculture
Fig. 338).

istory and People.—The coast of British Columbia was discovered
urtly explored by Spanish voyagers, and by Cook in the course of his
oyage in 1778. In 1793 Alexander Mackenzie first crossed the interior
journey from Lake Athabasca to the Pacific Ocean, and early in the
enth century David Thompson explored and opened up trade routes
he country from the upper waters of the Saskatchewan and
asca rivers. In 1849 Vancouver Island was granted a Governor, and
6 it elected its first legislative body. The discovery of gold in 1857
ht a rush of population to the province, and in 1866 Vancouver
l and the mainland were united under the name British Columbia.
71 it entered the federal union of the Dominion, one condition of
ation being the construction of a railway to the eastern provinces.

ines.—The wealth of the people depends very largely on mineral
cts. Gold was first discovered in auriferous sands and gravels on
ompson and Fraser rivers and their tributaries in 1857 and 1858,
n the early "60's" stories of the rich finds in the remote Cariboo
t were common throughout the English-speaking world. Until
tly this gold was almost entirely obtained from placer diggings, but
gold-bearing lodes have been found in the West Kootenay district
has consequently been made accessible by railways and steam
so that the dwindling placer mines of the Cariboo district are
n in the shade by the rich and rapidly developing lode mines of
outh. In 1897, silver derived almost entirely from the silver-lead
of the West Kootenay district, jumped to the first place among
ineral products, the total silver product exceeding in value that
d. The amount of lead produced is very considerable, and some
r also is obtained. The coal mines of Vancouver Island have long
an important place on the Pacific coast, as they not only supply the
ce itself, but lead the market in the coast cities of the adjoining
lic. Large coal-fields also exist in Queen Charlotte Islands, and
interior, notably in the Crow's Nest Pass of the Rocky Mountains,
gh which a railway has been carried to the Kootenay gold and
mining districts.

esources and Towns.—Throughout the province there is a vast
of country covered with forest, chiefly of conifers, among which the
valuable tree is the Douglas fir. Along the coast, and on Vancouver
l, there are many saw-mills which are supplied with this fir from the
ent forests, and from which lumber is largely exported. The fisheries
nother important source of wealth to the people. Salmon abound
ny of the streams, and are caught and put up in cans for export in
nous quantities. Halibut, herring, rock-cod, &c., are also caught off
ast. The pelagic sealing fleet is also largely owned in this province.
ere is much good agricultural land in the southern portion of the

interior plateau, on the deltas, and in the valleys of the principal r where, in addition to cereal crops, fruit of many kinds is now begin to be successfully cultivated. Difficulties of transport have heretc limited farming, but stock-raising is an industry of considerable im ance in the southern part of the interior.

Victoria, the capital of the province, is situated on a good harbour a south end of Vancouver Island. The provincial Parliament House is o the finest buildings in Canada. Three miles to the west is the great r harbour *Esquimalt*, the principal station for the North Pacific Squa of the British fleet. *Vancouver*, the western terminus of the Cana Pacific Railway, is situated on the south shore of Burrard Inlet, one of best harbours on the Pacific c and the point of departur regular lines of steamers to J and New Zealand. *New minster*, the first capital of the r land province, a short distanc the Fraser river, was founde 1858. *Rossland*, on the gold- near the Columbia river, has sp into existence as a city secor population only to Vancouver Victoria, and provided with railway communication with the United S In all the towns of the province there is a large Chinese element, mo the domestic servants and many labourers being Chinamen. Japa immigrants are also met with ; but in spite of the mixture of races B Columbia is perhaps the most English of all the provinces of Canada i life of the people as well as in the climate.

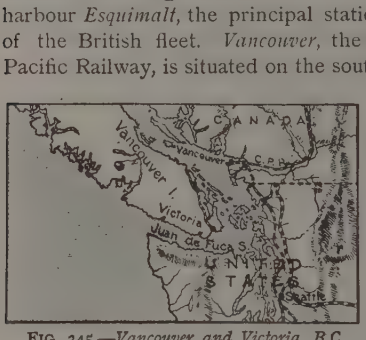

FIG 345.—*Vancouver and Victoria, B.C.*

THE TERRITORIES

Territories.—Outside of the organised provinces of the Dom there are vast areas which have long been known as the North-East North-West Territories. Recently these have been divided into dist some of which are provided with representative government, while o whose only inhabitants are a few scattered Indian hunters, are gov by the Dominion Parliament at Ottawa. These districts are nine in nu

Ungava.—The district of Ungava comprises the northern port the Labrador peninsula, north of the province of Quebec, excep eastern strip of coast which for 700 miles is under the jurisdicti Newfoundland. The western side of the peninsula is the rocky e shore of Hudson Bay, indented by many deep narrow bays, and s by a large number of rocky islands. The interior is a gently undu plateau underlain by Archæan and highly altered Cambrian rocks. main watershed is about the middle of the southern boundary of the d

rom there the rivers flow northward, westward, and eastward, and outhward through the province of Quebec. On the long Hamilton which flows south-eastward to the Atlantic, are the Grand, or McLean where the stream plunges 300 feet over a cliff into a narrow rocky . The country is more or less sparsely wooded as far north as the end of Ungava Bay.

eewatin.—The south-western and western sides of Hudson Bay, he country adjoining, are comprised within the great district of atin. Its coast on Hudson Bay is exceedingly low and flat south N. lat., while north of that latitude it becomes much more bold and . The lagoon at the mouth of the Churchill river is the only good ur on the more southern portion of this coast, and it remains unfrozen e average for five months in the year. Most of the country is under- y Archæan rocks. South of 60° N. the district is generally forested, red woods of small black spruce and larch growing on swampy . North of 60° N. it is almost entirely treeless, often forming an ating stony plain, thinly covered with short grasses and sedges. Count- erds of a small variety of reindeer roam over these plains. These are t the only living creatures in this country, the fur-bearing animals confined to the forests further south. The district is entirely beyond mits of settlement, and, as in Ungava, except a few white fur-traders nly inhabitants are Indians and Eskimo.

he Organised Districts.—Assiniboia, Saskatchewan, and Alberta, etween Manitoba and part of Keewatin on the east, and British nbia on the west, and between latitudes 49° and 55°. They are spoken the organised districts, for they have a Lieutenant-Governor, an d Parliament, and an Executive Council to attend to their local s, while at the same time they have representatives in both Houses of ominion Parliament in Ottawa.

its north-eastern corner the district of Saskatchewan touches the ocky Laurentian plateau, and is underlain by rocks of Laurentian Huronian age. South-west of this is a narrow strip underlain by an limestones, while the whole remaining portion, to the foot of the cliffs of the Rocky Mountains, is underlain by soft clays and sand- s of Cretaceous and Tertiary age, often covered by a thick mantle of The rise from the Archæan plateau to the foot of the mountains ges 5½ feet to the mile. This rise is not regular, though it indicates eneral slope of the country, but is most pronounced along the line of anitoba escarpment which marks approximately the eastern edge of retaceous rocks, and along the Missouri Côteau, which separates the d from the third or highest prairie steppe.

he Saskatchewan river, with its tributaries, drains the greater part of districts. Most of its branches rise on the eastern slopes of the y Mountains, some of the more northern ones being fed by glaciers, lowing eastward, unite into one great stream which empties into the

north end of Lake Winnipeg. At the mouth of the river is a heavy r
with a descent of seventy feet, but above this the main stream is navi
for river-steamers for 900 miles, while the south branch is navigabl
400 miles above its confluence. A small area in the south is dr
southward towards the Missouri, while north of latitude 54° most o
country is drained northward either to the Mackenzie or to the Chu
rivers. The surface is very generally dotted with small lakes and p
usually shallow, which lie in hollows in the general covering of
Many of these are without outlet, and some are quite saline, chiefly
the presence of sulphate of soda.

The whole of Assiniboia, and large tracts in the south of Saskatch
and Alberta are treeless, except in the deep valleys, consisting of g
plains or prairies, which usually extend to the horizon on every side
the level plain may be varied here and there by sandy or stony
appearing as high ridges in the distance, but on closer approach dwin
to grassy downs. A few plateau-like elevations, such as the Cypres
Hand Hills, rise 1,000 feet or more above the surrounding plain.
total area of this prairie country north of 49° N., including the p
portion of Manitoba, is about 193,000 square miles. North of the tr
prairies comes a belt of varying width, consisting of open grassy g
alternating with groves of poplar, north of which again is the conif
forest, composed chiefly of spruce and larch.

People and Towns.—The inhabitants are partly Indians, whil
remainder are immigrants from many parts of Europe and the ea
provinces of the Dominion. The attention of the people is almost en
devoted to agriculture and raising live stock. In the more eastern
of Assiniboia and in the partly wooded country near the banks o
Saskatchewan river, wheat, barley, and oats are grown to great pe
tion. In the drier country farther south and west, most of the p
are engaged in the raising of cattle, horses and sheep. Extensive
of coal and lignite underlie large areas, ensuring an abundant supp
fuel.

Regina, the capital of the North-West Territories, stands on a
plain on the line of the Canadian Pacific Railway and is the head-qua
of the North-West Mounted Police, who keep order over the whole re
Calgary, also on the railway, in the southern portion of Alberta, i
centre of the ranching country, and its handsome stone-built houses
trast with the wooden or iron dwellings common in newly-settled dis
A branch line runs north to *Edmonton*, on the Saskatchewan.

North-Western Districts.—The four districts of Athabasca,
kenzie, Yukon, and Franklin, together make up a full third of the Don
of Canada. With the exception of Yukon, all of these districts are w
white inhabitants, except a few fur-traders who have gone out in
wilderness to barter with the Indian hunters. The Indian popula
estimated at about 32,000. Athabasca and Mackenzie are esse

r in character. Their eastern half lies on the north-western extension
e Archæan plateau. Their western half is underlain by stratified
ones, shales, and sandstones, varying in age from Devonian up to
ene. The north-eastern corner of Mackenzie lies within the area of the
n Lands, beyond the limit of the growth of trees, while most of the
nder is covered with a forest of stunted spruce and larch, of no
ercial value. In the south-western part of Athabasca there are open
r woods, with some rather large tracts of open grassy prairie. Some
ns of the country west of Athabasca have a height of 3,000 feet,
east of that river there are elevations of about 1,700 feet. From there
ountry has a gentle and fairly regular slope northward through
enzie to the Arctic Sea. The most conspicuous breaks in the general
of this plain are the cliffs on the north shore of Great Slave
and the Copper Mountains, near the Coppermine river. The
asca-Mackenzie river traverses the whole length of the district.
furs secured by the Indians throughout the forests of this northern
ry are its principal source of wealth. Fish abound in the lakes and
ns and furnish valuable supplies of food for the traders and Indians.
lin consists of the islands of the Arctic Archipelago, varying in
from Baffin Land down to small reefs. These are underlain
ally by rocks ranging in age from Archæan up to Carboniferous, the
containing some good seams of coal, while in a few places Mesozoic
Tertiary rocks have been recognised. The greater part of the surface
very high, and in general character is similar to the Barren Lands
continent. Here the musk ox, polar bear, and reindeer have, as yet,
retreat. A few Eskimo are now the only inhabitants.

ukon.—Yukon Territory lies between the northern limit of British
bia and the Arctic Sea, and between the summit of the Rocky
tains on the east, and the boundary of Alaska on the west. In
al character it is a northern extension of the mountainous region of
h Columbia, though the ranges are not so distinct or regular. The
ns which drain it are nearly all tributary to one great river, the
n, which is navigable by river steamers for 2,400 miles from one
sources in Teslin Lake to the Bering Sea. Since 1897 discoveries
ch deposits of placer gold on the tributaries of the Yukon have
cted a large number of prospectors and miners from all parts of the
l to this remote region, where the gold of the Klondike river has
the growth of the town of *Dawson*. The gold produced in 1900 and
averaged £4,000,000 per annum in value. Access to Dawson is had
il from the United States port of Skagway in Alaska over the moun-
to the navigable upper waters of the Yukon. Yukon Territory, in
equence of its position in relation to the Pacific and the ameliorating
s of the prevalent westerly winds, is by no means so rigorous in its

climate as those parts of the continent further to the east. Except in extreme north, the lowlands are generally wooded, and hardy crops be grown with some chance of success almost to the Arctic Circle.

STATISTICS.

AREA AND POPULATION OF THE DOMINION OF CANADA.

Provinces.	Area in square miles.	Population. 1881.	Population. 1891.
Novia Scotia	20,600	440,572	450,396
Prince Edward Island	2,000	108,891	109,078
New Brunswick	28,200	321,233	321,263
Quebec	347,350	1,359,027	1,488,535
Ontario	222,000	1,926,922	2,114,321
Manitoba	73,960	62,260	152,506
British Columbia	383,300	49,459	98,173
Territories.			
Assiniboia	89,535		
Saskatchewan	107,092		66,799
Alberta	100,000		
Keewatin	756,000		
Athabasca	251,300	56,446	
Mackenzie	563,200		32,168
Yukon	198,300		
Ungava	456,000		
Franklin	Unknown		
Great Lakes of St. Lawrence	47,400	—	—
Totals	3,653,950	4,324,810	4,833,239

POPULATION OF CHIEF TOWNS.

	1881.	1891.	1901.		1881.	1891.
Montreal	155,237	216,650	267 730	St. John, N.B.	41,353	39,179
Toronto	96,196	181 220	208,040	London, Ont.	26,206	31,977
Quebec	62,449	63,090	68,840	Vancouver, B.C.	—	13,685
Ottawa	31,307	44,154	59,928	St. Henri	6,415	13,413
Hamilton	35,960	48,980	52,634	Victoria, B.C.	5,925	16,841
Winnipeg	7,985	25,642	42,340	Kingston	14,091	19,263
Halifax	36,100	38,556	40,832	Brantford	9,616	12,753

AREA AND ELEVATION ABOVE SEA OF THE LARGEST LAKES.

	Area in square miles.	Elevation in feet.		Area in square miles.	Elevation in feet.
Superior	31,200	600·5	Ontario	7,240	245
Huron	23,800	580	Athabasca	2,850	690
Great Bear	11,400	340	Winnipegosis	2,000	828
Great Slave	10,100	520	Manitoba	1,710	810
Erie	9,960	572	Nepigon	1,450	850
Winnipeg	9,400	710			

AVERAGE ANNUAL TRADE (*in pounds sterling*).

	1871-75.	1881-85.	1891-95
Exports	16,500,000	19,200,000	22,500,000
Imports	23,500,000	23,300,000	24,400,000

II.—NEWFOUNDLAND

By J. B. Tyrrell, M.A., B.Sc.,
Formerly of the Geological Survey of Canada.

Coast and Surface.—The large island of Newfoundland, lying a the mouth of the Gulf of St. Lawrence, extends from 46½° to 51¼° N separated from the mainland of Labrador by the Strait of Belle 12 miles wide, and from Cape Breton by Cabot Strait 60 miles

roughly triangular in outline, each of its three sides being between nd 400 miles in length; but while the north-western shore is rately straight, the southern and north-eastern shores are indented any deep bays, and fringed with a great number of rocky islands, form many magnificent harbours. The coast is for the most bold and rocky, and its total length is about 2,000 miles. The bays usually run in a north-easterly and south-westerly direction, heir shores are broken by many smaller bays. The bays of Notre- and Bonavista on the north-east coast are marvellously fretted by peninsulas and fringed with small islands. Heart's Content, on the side of Trinity Bay, is the landing-place of the Atlantic cables. Peninsula, with a length of 82 miles, lies between the great bays rtune and Placentia, while the peninsula of Avalon, in the south-east, ich the larger part of the population is settled, is almost cut off from st of the island by Placentia Bay on the south and Trinity Bay on orth, the neck of the peninsula being only three miles wide in its vest part. St. Mary's Bay and Conception Bay make great indenta- nto this peninsula.

e interior of Newfoundland is underlain chiefly by Archæan and Palæozoic rocks, arranged in long folds in a general north-easterly outh-westerly direction, parallel to the north-west coast, the older and r rocks forming the ridges, while the softer and later rocks occupy epressions. The Long Range, on the west side, is the highest and important of the ridges, varying in height from 1,000 to 2,000 feet. ndulating surfaces of the rocky hills are dotted with an immense er of small ponds and lakes, from which flow many brooks to form rger streams, the most important of which are the Exploits and au, discharging on the north-east coast, and the Humber river, dis- ng into the head of the Bay of Islands on the west coast. The tops rocky hills and ridges are for the most part scantily wooded or , while the river valleys and the land at the head of the deep bays sually thickly wooded with large and valuable timber, chiefly white spruce, larch and birch.

imate.—The Arctic current, bearing extensive fields of ice and icebergs, flows southward past the east side of the island, and tends er the temperature in summer, but very extreme temperatures are wn, the thermometer rarely falling below zero F. or rising above Dense fogs often hang over the south and east shores, but these extend many miles inland, and the weather in the interior is usually nd bright.

sources and Industries.—Though there are large areas of good ltural land in the interior, it has as yet been almost entirely ted, for the surrounding ocean contains such an abundance of fish als that the catching and curing of them occupies almost the entire on of the people. Early in March steamers and sailing vessels

put to sea heavily manned, and seek the ice-floes drifting down from north, on which the seals have brought forth their young. The sea season lists from March 16th to April 16th. After the sealing is over season for cod-fishing begins, and lasts from June to November. The

FIG. 346.—*Newfoundland and the Grand Banks. The French shore is shown by a double line.*

submarine plateau which ext around the south and east sh of Newfoundland, known as Grand Banks, and covered w depth of from 10 to 160 fath of water, is the greatest fish ground for cod in the world, ships of many nations congre there to gather the rich ha from the sea; and the bold well-trained sailors from N foundland, being nearest to Grand Banks, and provided a plentiful supply of bait (cap squid, &c.), which swarm on shores, come in for a full s of this harvest. The fish, v caught, are cleaned, salted dried in the sun on stages, w may be seen almost everywhere. Herring, capelin, and other fish are ca in considerable quantity along the shore. Salmon are caught in the ri and of late years a considerable industry has grown up in the catching canning of lobsters. Almost 90 per cent of the exports of Newfound consist of the products of the fisheries, more than half being dried cod

Iron pyrites, copper and iron ore are the principal minerals at pr worked, the first-named being exported to England for the manufactu sulphuric acid. Coal is reported to exist in considerable quantity, ch on the west side of the island, and lead and nickel are also said to o The timber is cut to some extent for local use.

Population and History.—Newfoundland was discovered by Cabot in 1497, at which time it was inhabited by the Beothuks, or Red Indians, a tribe whose exact affinities are now unknown, for the last survivor is supposed to have died in the early part of the nineteenth century. The fame of the cod-fishing off its shores soon spread through the maritime nations of Europe, and many ships from France, Spain, Portugal and England resorted every year to the Grand Banks, using the many harbours of the island as bases of operations. In 1582 an English Governor was appointed, and during the next fifty years s futile attempts were made at colonisation. Then for more than a ce

FIG. 347.—*The of Newfoundl*

a half colonisation was discouraged, the English merchants, who were ssing large fortunes by cod-fishing, not wishing to have to compete with bitants of Newfoundland. It was not till 1791 that a Supreme Court udiciary was erected in the island. At present there is a Governor ointed by the Crown, a Legislative Council, appointed for life by the ernor in Council, and a Legislative Assembly ted for four years by the whole people. The cutive is in the hands of a Ministry having the idence of the Assembly. For administrative pur- s the coast of Labrador is considered as part of colony of Newfoundland.

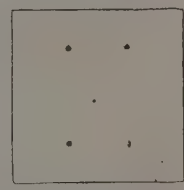

FIG. 348.—*Average population of a square mile of Newfoundland.*

The usual means of communication between one e and another has been by boats along the coast, a railway now crosses the island from St. John's ort aux Basques, passing through the most fertile well-wooded districts, and it is expected not only to open much of the rior to settlement, but also to form a part of a line of rapid communi- on between Europe and America.

Towns.—*St. John's*, so called because the harbour was first entered ohn Cabot on St. John's Day, is the capital. It is situated on the east of Avalon Peninsula, at the head of a magnificent land-locked harbour ile long and half a mile wide, which is entered through a deep, rocky age only 200 yards wide at its narrowest part. In it the largest ships ride in safety. It is the centre of the fishing trade of the island, and become one of the most important ports on the Atlantic seaboard, n the railway across the island is connected by fast steamers with the adian railway system, for it is nearer Europe than any other port in erica, being only 1,675 miles from Cape Clear on the west coast of and. *Harbour Grace*, the next town in size, stands on Concepcion Bay.

STATISTICS.

	1891.	1901.
Area of Newfoundland (square miles)	42,200	42,200
,, Labrador (square miles)	119,000	119,000
Population of Newfoundland	197,934	217,037
Density of Population of Newfoundland (per square mile)	4·7	5·2
Population of Labrador	4,106	3,947
,, St. John's	29,007	29,594
,, Harbour Grace	6,466	5,184

ANNUAL TRADE (*in pounds sterling*).

	1881-85.	1891-95.
Imports	1,630,000	1,400,000
Exports	1,574,000	1,350,000

III.—ST. PIERRE AND MIQUELON

BY M. ZIMMERMANN.[1]

St. Pierre and Miquelon.—The two little islands of St. Pierre and quelon with a permanent population of a few thousand persons, remain

[1] Translated from the French by the Editor.

in the possession of France as the only relics of the magnificent colon empire she founded in North America. They lie close to the south Newfoundland and, small as they are, only 93 square miles, they poss a real importance to the mother country on account of their proximity the Grand Banks where large fleets of French fishing-boats are engaged the capture of cod. The islands form the basis of the fish trade w France, and the exports of fish from the port of *St. Pierre*, on the island the same name, are steadily increasing, their value in 1894 exceedi five million dollars. Miquelon, although the larger island, has v few inhabitants, and the rainy climate with its frequent fogs does encourage immigration. In connection with these islands France reta certain fishing rights on the west coast of Newfoundland, which on t account is termed the French Shore (Fig. 346).

STATISTICS (1892).

	Area in square miles.	Population.	Density of Popula
St. Pierre	10 ..	5,700 ..	570
Miquelon	83 ..	550 ..	7

IV.—BERMUDA

By the Editor.

Position and General Character.—A solitary bank rising abrup from the depths of the North Atlantic in 32° N. and 65° W. bears a group small islands of remarkable formation known as the Bermudas. Farth north than any other coral islan they are of coral formation consequence of the warm wa carried northward by the gr oceanic whirl of which the G Stream forms part. The isla occupy a space of only twe miles by five, but are surround especially on the north and w by a growing reef through wh a few intricate channels ad vessels. Unlike other atolls

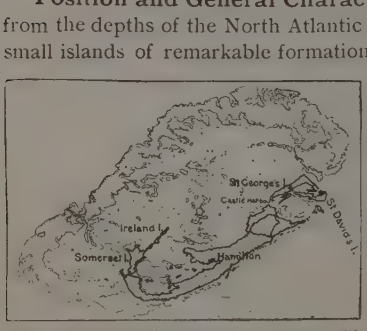

Fig. 349.—*Bermuda Islands and reefs. The map includes 30 miles by 20.*

Bermudas are in parts hilly, the heights, which rise to 260 feet, being for of blown coral sand, cemented by the action of rain into solidrock ; t are in fact petrified dunes. The sweeping curve of the hook-shaped i island brings it so close to the smaller members of the group that ma them are reached by bridges or causeways. The situation is as remark as the formation. From Bermuda as a centre a radius of 800 miles w sweep the coast of North America from Nova Scotia to Cape Hatte and a radius of 1,000 miles would sweep the east coast of Florida and whole line of the Antilles from Cuba to Antigua. This gives the i

ıp remarkable strategic value. Another element of importance is climate, which is remarkably mild and equable. The temperature never been known to fall below 40°; the monthly mean of February, coldest month, is nearly 63°; that of August, the hottest month, does exceed 80°. Hence in spite of poor soil the islands have become ed for the growth of early vegetables of excellent quality, and for ıy subtropical products; the staple crops for export to New York were 896, onions, early potatoes, and lily-bulbs. There is no lake nor stream ıe islands, and the wells yield somewhat brackish water, so that the ıbitants rely mainly on rain-water caught and stored in cisterns.

History, Government and People.—The group was discovered in ; by a Spanish navigator, Bermudez, and from the usual pronunciation ıis name it became known as the *Bermoothes*, a form perpetuated by kespeare when he laid the scene of "The Tempest" there. In 1609 shipwreck of Sir George Somers gave them the alternative name of ıers' Islands, and also led directly to the first settlement and colonisa- from Virginia and England. Bermuda is now a British colony under overnor, who is assisted by an Executive and a Legislative Council ıinated by him, with an elected Legislative Assembly as a Lower House. he population little over one-third is white, the rest being negroes and ıured people as in the West Indies. The main occupation is market lening, but the increasing use of Bermuda as a winter resort for wealthy ericans is also important. Steamers ply regularly to New York. A graph cable connects the islands with Nova Scotia, and may be pro- ged southward to the West Indies. Bermuda is an important British al station for the North American squadron on account of its central tion; the approaches to the channels are accordingly fortified, and rrison of about 1,500 British troops is permanently stationed in this ta of the western North Atlantic. The chief town is *Hamilton*, situated he main island.

STATISTICS.

	1885.	1895.
Area of Bermuda (square miles)	20	20
Population	15,036	15,794
Density of population per square mile	751	789
Population of Hamilton (the capital)	2,100	1,296

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The publications of the Canadian Geological Survey contain many valuable reports on exploration in all parts of the Dominion.

CHAPTER XXXIX.—THE UNITED STATES OF AMERICA

By William Morris Davis,
Professor of Physical Geography in Harvard University.

I.—HISTORICAL AND POLITICAL GEOGRAPHY

Discovery and Settlement.—The New World is fortunate in lyi with its lesser highlands towards the narrow Atlantic which separates from western Europe, the home of active and inventive Caucasians, a in presenting its greater highlands to the broad Pacific, which separates from eastern Asia, the home of the unprogressive Mongolians; for to th accident of position—if such it be—the discovery and colonisation of t New World by the best race of the Old World may be ascribed. century of discovery along the eastern coast led to a century of colonis tion, this to a century of rapid colonial growth, and this again to century of independence and expansion for the middle colonies of th Atlantic border. At the close of these four centuries the United Stat has become one of the foremost nations of the world in extent, variety, a value of territory, and in number, intelligence, and wealth of population.

The English colonies of the Atlantic coast between the St. Lawren and Florida were established at first with relation to the harbours that ga protection to the vessels by which intercourse with the mother count was maintained. From the harbour settlements as centres, large areas land were claimed under the authority of royal grants; thus the coast w subdivided among a dozen colonies, some of which laid claim to indefinite extent of inland country. Progress into the interior was in m cases opposed by the aboriginal Americans, of tribal organisation, to wh the name of "Indians" was given by the early discoverers as if to set lasting mark on their faulty reckoning of longitude. Idealised in roman too often abused in the rough realities of frontier life, the Indian wa rude savage. He probably lived as closely to his ideas of virtue and d as the colonists did to theirs, and when fairly treated, as by the Quak under Penn, he was peaceful; but the ideas of natives and of new-com were usually unlike, even irreconcilable. Each one often accused other of injustice, and the intercourse between them was constan interrupted by petty warfare, resulting in an aggressive advance of whites into the lands of the Indians. The progress of the backwoodsm among the Alleghenies in the eighteenth century, of the frontiersman the prairies, plains and mountains, and of the Indian agent, acting for

ernment under profitable contracts in the nineteenth century, does not e a glorious history to review, so far as it deals with native tribes.

Hardly less fortunate than the narrowness of the Atlantic is the north- l trend of its coast lines, as a result of which the inland progress of the y English colonists, and of the later immigrants from many countries, ied them westward across North America within the limits of a single atic belt, instead of northward across many. The belt thus naturally ked out includes the greatest area of the best land on the continent. The y boundaries of the belt lay near the St. Lawrence on the north, where French had planted colonies, and near the Gulf of Mexico on the h, where Florida was colonised by the Spaniards. From these nnings a great expansion was accomplished in the century of inde- dence; and the new territory, at first in charge of governors appointed Washington, was gradually, part by part, brought into the fellowship tates, until at present only New Mexico, Arizona, a remnant of Indian ritory, and the re- e Alaskan province still outstanding.

The Declaration of ependence on the of July, 1776, was natural result of ist legislation on part of the British ernment imposing dens upon the colo- without offering ivalent privileges to n, and Great Britain

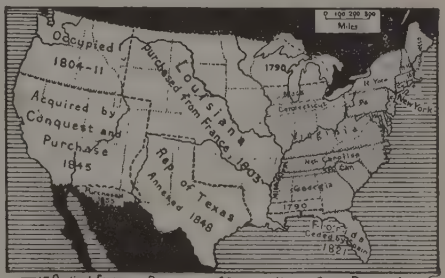

FIG. 350.—*The expansion of the United States.*

compelled to recognise the independence of the colonies in 1783. rida was bought from Spain in 1819, Louisiana (the western half of the sissippi basin) was bought from France in 1803, Oregon was acquired ight of exploration, the south-west from Texas to California was gained n Mexico between 1845 and 1853, after a manner which the Americans aptly inherited from their ancestors in Europe, and Alaska was bought n Russia in 1867. Finally, Hawaii was annexed, the Philippine Islands Porto Rico were ceded by Spain, and the protection of Tutuila in noa was assumed in 1899.

The States and the United States.—Since the formation of the ion, and particularly since its cementation after the Civil War of 1–65, the geographer may turn his attention from the single States to United States, and this is now done even in the descriptive pages of ool geographies, the best of which divide the United States into rsical districts, and refer to the separate States chiefly as a means of ing location to the physical features and their industrial consequences.

The individual State is still a unit for the politician and the lawyer, b it is a fraction for the geographer, and very often an improper fractio The Ohio and Mississippi rivers are exceptional in serving as natur boundaries for many States; but even the great Mississippi does n divide States at its head or at its mouth. The Appalachian mountai system is most irregularly partitioned among the older States. Th western States are generally bounded by lines dependent on the form a rotation of the globe, after a method that has become habitual wh civilised man wishes to divide thinly settled and unsurveyed territor The strong front range of the Rocky Mountains, rising abruptly from t plains, forms no State boundary, but is crossed by the borders of Montan Wyoming, Colorado, and New Mexico. Commerce is free to cross Sta limits, while the principle of protection regulates the trade of oth nations with the United States as a whole. Many manufacturing a mining companies are incorporated in one State where local laws gi them some advantage, carry on their business in another State, a perhaps have their financial office in a third. Railroads truly must ha charters from every State that they cross; but this is merely a leg technicality, of no consequence to the passengers or the freight that a carried over the tracks. Several lines of transatlantic steamers, nominal bound for New York City, land their passengers in New Jersey; and b for the accident of a State boundary that runs through New Yo harbour, Jersey City would have probably been included in the Great New York, recently formed by consolidating several cities with t metropolis. State capitals are often of less importance than the co mercial cities, whose growth follows physical controls. Many busine men in border cities reside in the adjoining State, and cross the bounda to and from their work every day: Philadelphia has suburbs across t Delaware in New Jersey; St. Louis across the Mississippi in Illinois; a Kansas City itself spreads across the line between Missouri and Kansas.

Government.—The republican form of government adopted by t United States is in many ways paralleled by t governments of the individual States. There is national constitution, under which each State l its individual constitution. The Union, like t separate States, has the three usual divisions governmental functions—legislative, executive, a judicial. The President of the whole country h his Cabinet of the heads of departments; Governor of a State has similar councillors. Supreme Court sits at Washington, and dist federal courts sit in different parts of the cou to act upon questions in which the interests of citizens of more than State are involved. Each State has a similar judiciary for the deci of local matters. The Congress of the United States consists of the Se

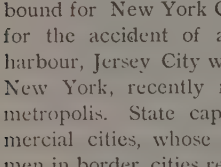

FIG. 351.—*The Flag of the United States—the Stripes representing the* 13 *original States, and the Stars the present number.*

ne House of Representatives; the Legislatures of the States are ly divided. The national Senate includes two members from each -not a satisfactory method of representation to-day, since Nevada e population is decreasing), Rhode Island, and Delaware are placed equality with New York, Pennsylvania, and Illinois. The represen- are chosen on the basis of population. The laws passed by Congress iform for the whole country. Within limits thus defined, the several frame laws for themselves, often of great diversity in different parts country. Many laws regarding slavery formerly obtained in the rn States; liquor laws, restricting or prohibiting the sale of intoxi- liquors, have been passed in several northern States. The right to as been extended to women in some of the western States, where rvative traditions have less hold than in the east. With the desire to se their population, other States have been over-liberal regarding e laws; and the desert State of Nevada has even gone to the offensive ne of permitting prize fights, as if in the vain hope of staying its loss of numbers.

eople.—The remoteness of the United States from formidable neigh- has fortunately not required the withdrawal of many persons from rial pursuits into the army and navy; and as long as the territory the national government remains compact it is probable that the n of an elaborate, expensive, and unproductive military and naval ishment may be avoided. There is little need for forts and soldiers the country itself. It is true that individual differences have been ften settled by violence rather than by appeal to the courts; but the rapidity of settlement and the heterogeneous nature of the ation are considered, and when it is remembered that even during entury of independence a large part of the population has had nal experience of the rude conditions of frontier life, the prevalence od order becomes the striking feature of the country. This must be ed chiefly to the plentiful and profitable occupation that the vast t of new land gave to all comers during nearly all the century of endence; for even with a decennial increase of from five to ten ns there has been land enough and to spare. Another beneficent of plentiful occupation has been the rapid assimilation of immigrants, eby the foreigners from many lands have soon been Americanised. lure of this process is seen to a greater or less degree in large cities, rtain mining regions, and in some parts of the north-west where the ment of immigrants, derived largely from a single European country, s the retention of at least a foreign language if not of other customs gn to the United States. But in spite of these deficiencies, the leading remains that, as a whole, the great population has become naturalised s new continental home with a success that recalls the spread of es in Argentina and rabbits in Australia; and although uncompli- ary, the comparison is based on sound biological principles.

Religious freedom and public education have contributed largely the good results which plentiful and profitable occupation have chie controlled. There is no established church, and the several lar religious bodies are so strong that no one is likely to overpower the oth Illiteracy is rare, except among the negroes and poor whites of the sou Besides the public schools, for which provision is made with constan increasing liberality, there are State colleges in most of the States, a there are only too many sectarian colleges, especially in the north and e of the plains, established as if for the religious safety of the young of several denominations. Large gifts have been made to educatio institutions by wealthy men; and the strongest universities of the coun Harvard, Yale, Columbia, Princeton, Pennsylvania, Johns Hopki Chicago, and Stanford, have thus been supported in great part. Pub libraries are numerous; they are frequently the gifts of successful men the homes of their boyhood. The establishment of scientific Governm Bureaus has greatly contributed to the development of the natio resources. Notable among these is the Geologi Survey, now engaged in mapping the entire natio domain; and the liberal method of disposing of publications at a nominal price, in order that t shall be widely used, deserves imitation elsewh The Weather Bureau of the United States is uni in the area covered, and in the promptness of p lication of its daily maps.

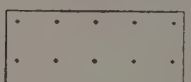

FIG. 352.—*Average population of a square mile of the United States.*

With the aid of education, and the incentive industrial opportunity, the people of the north States have been remarkably fertile in mechani inventions, to say nothing of the application of perverted ingenuity to development of "rings" in politics and "corners" in the markets, and monopolies and over-profitable trusts in corporations.

Towards the close of the nineteenth century certain unfavoura reactions followed the rapid growth in population and wealth. Im grants of a less desirable class than the early comers have m their appearance in increasing numbers, chiefly from eastern and south Europe. Many of them remain in crowded seaports instead of ente further into the country. Disputes between incorporated employers the employed have become more and more serious in their nature. multiplication of factories and the competition among manufactu compels such economy in production as to reduce wages, and for reason more than any other, new markets for manufactured products now eagerly looked for. If the twentieth century witnesses a territ expansion beyond the present boundaries, the change will be made lar on commercial grounds; for with nearly all the valuable public lands disposed of to incorporated or to individual owners, and with a ra increasing excess of production over consumption, the demand for

ortunities on the part of the "business men" may prove stronger than resistance of those conservatives who feel that a republic of wide-ad territory is not compatible with the Declaration of Independence the principles of the Constitution. That such a result should have ady come within the range of possibility only emphasises the marvel-changes of the United States during the century of independence.

Trade.—The foreign trade of the United States is mainly carried on he seaports of New York (through which almost one-half of the trade he country passes), Boston (which comes next with only one-tenth), v Orleans, Baltimore, Philadelphia, and San Francisco. It is carried mainly under foreign flags, only one-ninth of the value of the export import trade being done in vessels belonging to the United States. the other hand, no foreign vessels are allowed to engage in coasting trade n one port of the United States to another. The value of the exports siderably exceeds that of the imports. The former consist mainly of cultural produce—wheat, animals, preserved meat, &c., from the rie States, and raw cotton from the south Atlantic and the Gulf coastal ns; these together make up two-thirds of the exports. Manufactures exported nearly to the value of one-third, most of the products of es and forests being required for home use. The imports are mainly of ducts which cannot be produced in the United States, or not in suffi-t quantity for the demand, such as coffee, sugar (the largest import, ounting to one-seventh of the value of the whole), raw wool and silk, certain manufactured goods. The import of such articles as can be nufactured in the United States is discouraged by the imposition of a vy tariff, which raises the price to the consumer, and so benefits the nufacturing class with less advantage to the farmers. Nearly half of exports go to the United Kingdom; Germany comes next in import-e as a customer, and Canada, France, and Holland follow. The United gdom sends one-fifth of the total imports, Germany and France come t with one-fifth between them. The imports are drawn from a wider l than that over which the exports are distributed; thus, while at least per cent. of the exports are sent to Europe, only 55 per cent. of the orts are drawn from that continent. The recent development of the l trade is shown in Fig. 71.

II.—REGIONAL GEOGRAPHY

THE APPALACHIAN BELT

The Appalachian Belt.—The chief geographical features of the ern United States cannot be appreciated until it is understood that a at part of the region has been uplifted by tectonic forces, worn down a nearly level surface by erosion, and after being again more or less ited is now once more in process of dissection. The Appalachian

Mountains were first formed by disturbances so long ago that once least in later times the mountains have been worn down to an extensi lowland of moderate relief, close to the level of the sea; and the mountai of to-day are either the occasional unconsumed remnants of the lost range or the product of renewed uplift and dissection. Thus viewed, the App lachian belt may be easily subdivided and described; thus described, close connection will be found between its geological history and i present form; and again, between its present form and its control ov human conditions.

Divisions of the Appalachian Belt.—An eastern division of th Appalachian belt consists of ancient crystalline rocks, such as schists an gneisses, with many areas of granites and other igneous intrusions. western division consists of a great series of Palæozoic strata, chief derived from the waste of the older rocks on the east, and now great tilted and folded. Both of these divisions were well worn down to lo lands over the greater part of their area during Mesozoic time; but th hardest parts of the crystalline division survived in residual mountains, f which the generic name *monadnock* is coming into use, after a fine residu mountain of this name in south-western New Hampshire. The Whi Mountains of New Hampshire and the Black Mountains and other rang in North Carolina seem to be groups of such monadnocks.

If viewed in Cretaceous times, the Appalachian region would have be seen as a broad, gently rolling lowland, here and there surmounted b monadnocks, singly or in groups. Since then the lowland has been rais into an upland, bearing the monadnocks on its back. The quiet strea of the lowland were thus revived into new vigour, and new valleys ha consequently been incised beneath the upland surface. Unlike the earli mountain-making disturbances, the later uplift was of a gentle natu producing a broad swell, whose arch-line follows the Appalachian tren and whose side slopes fall off slowly to the south-east and north-we Much of the Appalachian system is therefore not mountainous to-day; ne the sea it may even include extensive areas of low land. The broad uplifted portion has regained the appearance of mountains chiefly by t excavation of valleys along the belts of weak rocks, or along the paths its larger streams. The mountains and ridges of to-day must therefore regarded as forms of circumdenudation, like those of the Scottish Hig lands, in contrast to mountains of direct uplift, such as occur in certa parts of the western United States.

Following principles of wide application, it may be briefly stated th the valleys worn by the larger streams in the uplifted lowland are n deep where the lowland was raised highest, and shallow where the le uplift occurred. Again, the valleys are broad where the rocks are re tively weak; here, indeed, lowlands of a later generation have be developed, above which the local belts of harder rocks stand as resid hills and ridges of the second order. Where the rocks are resistant

eys are still narrow, time enough not yet having elapsed since the ft to permit the valleys to grow wide. The varied combinations of se controlling factors give rational explanations to a great variety of graphical forms.

The Older Appalachian Belt.—The eastern or crystalline division he Appalachians—the Older Appalachian Belt, as it may be called A in Fig. 353)—consists so largely of resistant rocks that its uplands serve the altitude given to them by uplift over large areas, and the eys worn out by the streams are relatively narrow. The western or tified division—the Newer Appalachian Belt (N A in Fig. 353)—includes nuch larger proportion of easily weathered rocks; hence its valleys well worn down, and its narrow ridges occur only where the harder ta are found. The even crest lines of the ridges, a striking feature of Newer Appalachians in Pennsylvania, Virginia, and Tennessee, are logous to the even uplands of the Older Appalachians. The breadth he older and newer belts is very variable. The older belt is narrow low between New York and Washington, and broad and high in v England and North Carolina. The newer belt is represented chiefly a broad valley north of Albany; it is still broader, with many ridges valleys in Pennsylvania and Virginia.

After thus recognising the division of the Appalachians into two chief gitudinal belts, there are certain contrasts between the northern and thern part of the system that deserve attention. North of New York r, a comparatively recent depression of the Appalachian region, in- asing towards Newfoundland, has drowned the borders of this geo- phical province beneath the waters of the Atlantic, bringing the sea inst the resistant rocks of the once deep-seated mountain structures. th of New York, an elevation of the region, increasing towards Ala- na, has revealed the unconsolidated deposits of a former sea bottom in coastal plain of the southern States. Few simpler examples of the nner in which crustal movements determine geographical forms can be nd than this, and few in which the arrangement of geographical forms a more direct influence on the conditions of human life.

The Atlantic Shore Line.—The shore line of the northern Appa- nians is extremely irregular; many long arms of the sea enter between rocky headlands and outlying islands; comparatively deep water is ried into the re-entrants of the coast, making numerous and excellent bours; but the rugged hill country follows almost immediately inland, couraging agriculture. Mount Washington, the highest of the White untains, and many other monadnocks are in sight from the sea.

The shore line of the southern coastal plain is usually fringed with sand s, broken by tidal inlets and enclosing shallow lagoons. The sea is llow, deepening very gradually towards the outer edge of the con- ntal shelf, where the rapid descent to the true ocean basin begins, a ndred miles or more from shore. The land is very flat, ascending slowly

inland; no hills surmount its surface. It is traversed by rivers whc courses have been extended forward from the former shore line at t inner border of the coastal plain, but the river valleys are eroded only a very moderate depth; not until the inner border of the plain is a proached is the surface so well dissected as to be called hilly. Agricultu is promoted on the more fertile parts of the plain, and upon the deep so of the smooth uplands of the Older Appalachian Belt, next inland. Wh it is remembered that the rugged surface of New England was settled religious refugees, whose convictions were as rugged as the country th peopled, and that the southern States were settled by colonists whc motives were generally commercial rather than religious, a long sequen of historical consequences may be traced from the association of unli people on unlike lands.

The movements of the land whereby the configuration of the shore li has been effected must be pursued one step further. A slight depressi has followed the elevation of the coastal plain from New Jersey to Nor Carolina; thus the broadened valley floors of the chief rivers have be submerged, forming bays and estuaries, from that of the Delaware to th of Pamlico Sound. On the other hand, a recent movement of elevation h partly counteracted the previous movement of depression in New Englar for the littoral districts of Maine and New Hampshire contain smooth plai of marine clays that interlock with the rocky arms of the land.

The order of settlement, the arrangement of State boundaries and t occupation of inhabitants in this region had been profoundly affected the physical features, thus briefly sketched. The early colonists in tid water Virginia found protected harbourage in the many branching bays the Chesapeake and lower Potomac; for many years communicati between them was more easily carried on by water than overland throu the forests. Although the drowning of these former valley lowlands h been a loss to agriculture, there is some compensation for the loss in t valuable fishing grounds which they afford. Their importance in det mining political units is manifest. The largest bays of the coastal pl divided the colonies of Virginia and Maryland. Another bay led to t establishment of Pennsylvania and Delaware, leaving New Jersey on eastern side. The south-pointing peninsular areas defined by the b determined the small area of the three colonies that occupied them, contrast to Virginia and Pennsylvania, which at the time of the Revoluti claimed all the land westward to the Pacific.

The Atlantic Coastal Plain.—Various features of the coastal pla constantly reflected in the distribution and occupation of the people, n well serve as types for this class of land forms. The outer border of plain, fronted by shallow water and fringed with sand reefs from Ne Jersey to North Carolina, attracts no commercial settlements, but is i creasingly frequented as a holiday resort: *Atlantic City* on an off-shore re in southern New Jersey is the largest town of this kind (Fig. 354). Al

FIG. 353.—*Physical Divisions of the United States.*

the North Carolina shores, the sand reefs, locally known as "banks," ha
a peculiar concave outline to the sea, meeting in sharp points or cus
forming Capes Hatteras, Fear, and Look-out. These are believed
be due to the interaction of several large back-set eddies of the lo
shore waters, which seem to turn in local circuits between the Gulf Strea
and the continent. The cusps are the most perfect examples of such sh
forms anywhere known. The "banks" are occupied by small communit
of isolated people, known as "bankers." A small breed of horses, kno
as "banker ponies," here run wild, subsisting on the coarse grass th
grows on the sandy soil; in the absence of brooks, the ponies find fre
water by pawing away the sand in the depressions between the dunes.

The islands along the coast of South Carolina are peculiar in bei
interrupted by numerous tidal inlets, a direct result of the increased streng
of the tides in the "Carolina bight" of the Atlantic coast. Here the o
shore islands are not entirely composed of sand reefs, but in part resemb
detached portions of the mainland; their soil is rich and produces t
famous "Sea Island cotton"; th
are exposed to dangerous s
floods, when on-shore hurrica
winds conspire with a rising ti
The tidal waters behind the islan
are much reduced in area by t
growth of extended marsh
whose inner stretches produ
abundant rice crops.

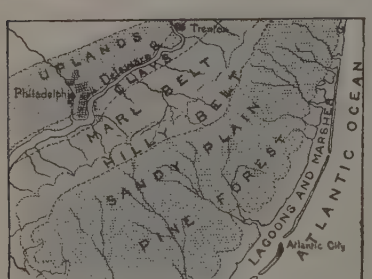

FIG. 354.—*Part of the Atlantic Coastal Plain.*

The important commercial cit
of the coastal plain are genera
situated on embayed valleys a
estuarine rivers; some are n
the coast line, like Norfolk, Va., Wilmington, N.C., Charleston, S.
and Savannah, Ga.; others are at the inner border of the plain
Trenton, N.J., Philadelphia, Pa., Baltimore, Md., Washington, D.C., a
Richmond, Va., these cities being at or near the head of tide wa
Others, like Raleigh, N.C., and Columbia, S.C., are at the "falls"
their respective rivers, above the reach of tide, but at the head
river navigation; the "falls" being formed where the streams, com
forward from the interior, pass from the resistant rocks of the ol
land to the unconsolidated strata of the coastal plain. If an observ
traveller should traverse the coastal plain along any of the transv
inter-stream strips or "doabs," into which it is divided by the cl
rivers, he would find that its soil, the surface expression of its loose
tured strata, is arranged in belts that trend nearly parallel to the Atla
shore line; cleared and farmed where marly or limey, barren and lef
pine forests where sandy; the forest, however, yielding large quantitie
lumber and resinous products in the southern States. Southern Virg

North Carolina include extensive fruit and vegetable farms on the other parts of the coastal plain, from which the markets of the northern es are now largely supplied. Part of the plain near the shore is so low flat that the growth of vegetation builds up its surface, forming exten- swamps, of which Dismal Swamp, on the borders of Virginia and rth Carolina is the largest example. Unlike many other swamps, these upy the highest ground in their district, and streams run out of them, into them; where drained and cleared they have been transformed into d farming land.

On passing inland, an increasing diversity of relief is found; the low plain near the shore is gradually replaced by a surface in which the ey slopes of the intrenched streams have the appearance of hills; but ur language would permit it, this district should be called a valley rather n a hilly country. The more resistant layers of the plain, generally half nented sand-stones, sometimes come to surmount the less resistant and re denuded layers further inland, giving a belt-like arrangement in form vell as in soils. Thus a low upland encloses an inner lowland from Newark Camden, N.J., important as a natural pathway between the chief Atlantic es and characterised by many pits and potteries on its clayey substratum. esian water supply is a marked feature of the stal plain, where its importance increases with the growth of the popu- on, and with the better understanding of the menace to public health shallow surface wells and polluted streams. The larger shore resorts the sand reefs are supplied in this way as well as the mainland. tain towns in peninsular Maryland sink their artesian wells into water- ring strata or "aquifers," that reach the surface and gather their rainfall st of Chesapeake Bay.

People of the Coastal Plain.—As the southern colonies grew the coastal plain and the people pressed inland, they found an en country, easily occupied as far as the residual mountains of Blue Ridge and its fellows in Virginia and North Carolina; but se and the Allegheny Plateau were long-enduring obstacles to settlement of the further interior. In North Carolina particularly, ere the old Appalachians are broadest and most mountainous, vement from east to west was almost forbidden; and to this day an usually large share of the descendants of the early colonists remain on coastal plain, on the piedmont slopes, or among the valleys of the inner untains, with comparatively little gain by immigration from Europe. where else in the United States is so large a part of the population ative born" and "born of native born." Local habits of speech and home- n clothing are no rarities in villages among the mountains, which form itting geographical environment for conservative ways of life.

New England.—On the New England coast, examples of geographical ntrols are no less distinct than further south. Here the distinction tween upland and lowland depends chiefly on the distribution of strong

and weak rock structures in the Older Appalachian Belt. The strong str
tures still preserve something of the upland surface gained by the uplift
the worn-down old Appalachians; they are low only near the coast, whe
they were little uplifted. The weak structures are already worn down
lowlands again. In the present depressed attitude of the region, t
stronger structures stand forward in headlands on the coast line, like that
Cape Ann, Mass. *Gloucester*, on a good harbour on this headland, sends
a large fleet of fishing vessels to the Newfoundland Banks: the headla
granites are quarried at *Rockport*, and sent away in heavy-laden schooners
more southern ports. The valleys and lowlands are more or less drown
forming embayments like Boston Harbour; and *Boston* has outstripp
the neighbouring settlements of Plymouth and Salem, its rivals in ca
times, in great part deca
it stands further inla
and therefore in better c
nection with the inter
population of later grow
In New England many
the towns borrowed nam
from the mother countr
but the chief colony to
the name of a monadno
a few miles south of Bost
and now reserved as
metropolitan park, a
known to the Indians
colonial days as "Mas
chusetts" or Great Hi
the first land to rise o
the sea horizon on
proaching Boston from
east.

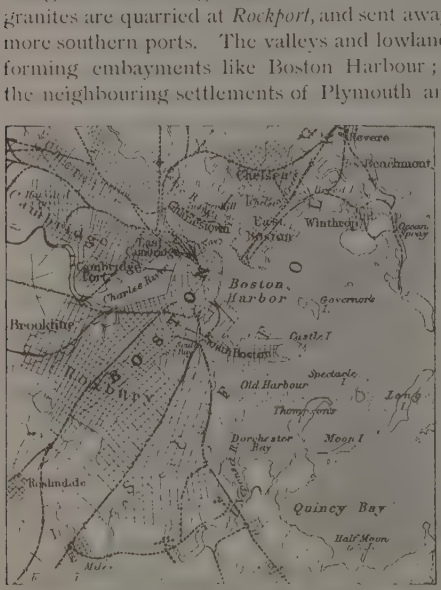

FIG. 355.—*The Site of Boston, Mass.*

The rugged uplands, gradually gaining height inland, were slowly sett
and still offer only hard conditions to their occupants, however well
villages and cities in the valleys may thrive. After a trial of the hig
uplands as dwelling places in the eighteenth century, many families mo
out west to the prairies in the nineteenth century; towards the close of
latter period, the "hill towns" of western Massachusetts exhibit a ve
general decrease of population. Here the Old Appalachian Belt is so br
that no river crosses it. Its gain of height (apart from the scattered
grouped monadnocks that rise above it) is so well maintained northwa
and westward, until reaching a sudden descent from its culmination
the Appalachian valley, that the crest line naturally suggested colonial a
international boundaries; thus New York, led inland northward by t
Hudson valley, acquired the land west of the Taconic and Green Mountain

l Canada on the north would have been limited by the divide between Atlantic waters of Maine and the branches of the St. Lawrence, had not h a boundary lain further north than was expected. Here in the north, barrier of the Older Appalachian Belt, broad and rugged like that which arated the Carolina colonies from the interior wilderness, divided New gland and its Puritan stock from Canada and its French population.

It was to a lowland, etched out beneath the general level of the upland l then partially submerged in Narragansett Bay that Roger Williams and independent followers removed from the Massachusetts Colony; thus city of *Providence* and the little Colony of Rhode Island were founded. *eport*, on an island at the entrance to Narragansett Bay, has become a pular seaside resort on account of its agreeable climate. Parties of tlers around Boston finding themselves crowded, and like an over-cked hive of bees, as a contemporary writer said, ready to swarm, ssed the hilly uplands in 1637, and entered the Connecticut valley low-d, a broad depression worn down on a belt of comparatively weak iassic sandstones. Some of the towns thus founded remained members their parent colony; others asked for a new charter, and thus the small lony of Connecticut was formed; it is crowded, like Rhode Island, tween its larger neighbours. Its chief cities, *Hartford* and *New Haven*, in the lowland that attracted its early settlers.

Further north the uplands are so extensive, the monadnocks are so merous, and the valleys are often so deep-cut, that the population has own slowly. Northern Maine is still a forested wilderness; outlying ttlements there are to this day called "plantations," in the sense of the ord used by the early colonists, and not with the acquired meaning of n extensive farm," usual in the southern States. Remnants of Indian bes still remain here. Only the southern part of Maine is well peopled; *rtland* having a fine harbour on the coast; *Augusta*, the capital, and *ngor*, a great lumber market, being situated at the head of tide on e estuarine waters of the Penobscot and Kennebec rivers. The coastal rder is here almost too much dissected by the drowning of its valleys d lowlands; for its village communities are thus isolated to disadvantage islands and long slender land-arms; local travel in small boats is not ways easy on account of the tides, whose strong rise and fall often make nding troublesome, and whose rapid currents frequently overcome oars d sails. In the last thirty years a large "summer population" has sorted to these islands, where the cool water gives the air a mild tem-erature. Mount Desert, already mentioned, containing a number of sum-its over a thousand feet in height, the boldest land on the eastern coast the United States, is the most famous of these summer settlements.

New Hampshire has the advantage of a good harbour at *Portsmouth*, d of a fine river in the Merrimack; but its uplands are thinly peopled, d its mountains are visited only by lumbermen and vacation tourists. eforestation is already giving cause for alarm here and in Maine, especially

since even the smaller trees are taken to feed the pulp mills, called int being by the many pages of the modern newspaper. The State of Ver mont has no seaport and an over-large share of rugged highland. It industries are rural rather than manufacturing or commercial; its popula tion is increasing slowly.

In all the New England States building stone is an important product Granite and similar crystalline rocks are quarried extensively, man quarries having the advantage of a situation on or near a navigable tid water. Marble and slate are found in the Green Mountain valleys. Sand stone is taken in large quantities from the Connecticut valley for use i ornamental architecture.

Glacial Action in New England.—The imprint of glacial actio is strong in New England. The deep soils of the southern State gradually passing into firm rock at depths of from thirty to fifty feet, ar here replaced by an immediate change from the surface drift, of ver variable thickness, to the glaciated surface of firm, unweathered roc Many ledges on the upland hills have been left almost bare of soil; a thi deposit of drift in the crevices, slightly increased by post-glacial weathering suffices only to support tree growth. Elsewhere the uplands are blanketed over with unstratified drift or till, a compact deposit of rock scraping from further north accumulated under the slowly moving ice sheet wher more waste was brought than could be carried further forward. The ti frequently assumes the form of rounded, oval hills, known as drumlin half a mile or more long, and from 100 to 300 feet high. These ar sometimes so plentifully covered with boulders that they hardly serve eve for pastures; but more generally they are cleared and farmed. In certai districts drumlins are so plentiful as to give their pleasing expression to th landscape: southern New Hampshire, and eastern and central Massachu setts contain them in great numbers; the islands of Boston Harbour (Fig 355) are nearly all drumlins, cliffed by the waves and furnishing dri for the construction of extensive beaches.

In the valleys and on the lower ground near the coast, various forms o washed drift generally bury the ledges out of sight. Extensive terrace occupy the larger valleys; their higher levels are rather too sandy for th best farming land; their lower levels, flooded by the rivers, offer attracti meadows of which none is more beautiful than that of Deerfield, on branch of the mid-Connecticut, the scene of early settlement and disastrous struggles with the Indians. It is chiefly in connection with th irregular distribution of the valley drift that the numerous small lakes New England are to be explained. Their basins were first accounted fo by glacial erosion, but at present it is more generally believed that the mark the sites of lingering remnants of the melting ice sheet, while th evacuated space about them was filled with sands and gravels. The lak form natural reservoirs for the water supply of the villages and cities the water being pure except in autumn, when, the temperature bein

niform from surface to bottom, overturnings are easily caused by the inds, and the impurities gathered in the deep water during the summer are scharged. Ice from the lakes is an important winter harvest; and at ne time Wenham ice, from a small lake near Salem, was famous even n India.

Water Power in New England.—The rivers, entrenching their ourses in drift-clogged valleys have repeatedly lost their former channels nd cut down upon rocky ledges; thus dividing their courses into smooth-owing reaches and hurried rapids and falls. The latter supply the great ater power of New England, on which its vast manufacturing industries egan. *Fall River*, on an eastern branch of Narragansett Bay, was at first tisfied with the power derived from a small stream; now its myriad pindles are driven by steam. The mills here and in *New Bedford*, a ttle further east, profit from the high humidity of the atmosphere near the ea, an important factor in spinning cotton. The sites of *Lowell*, *Lawrence* nd *Manchester* were occupied by farms seventy years ago. Enterprising apitalists and engineers took control of the great water powers of the Merrimack, and to-day the river, supplemented by steam in dry seasons, rives more cotton mill spindles than any other river in the world. housands of French Canadians now make their homes in these factory ties, working as operatives in the mills.

In Maine the falls of the Saco gives rise to the paired cities of *Saco* and *iddeford*; those of the Androscoggin determine the sites of *Lewiston* and *uburn*. It is noticeable that these manufacturing towns in Maine are near s south-western corner; numerous water-powers in other parts of the tate are too remote from the chief markets of the United States to be tilised to their full value at present. In Connecticut, on the other hand, ear the great commercial centre of New York City, hardly a single aterfall is idle. Here a certain feature of water-powers of indirect lacial origin deserves notice. In the normal river, the trunk stream has, s a rule, graded its course so as to secure a steady flow; it may even be avigable. Rapids and falls are found only on the upper waters, where the naller branches, working in districts of greater altitude and frequently on ocks of greater resistance, have not yet been able to wear down their hannels to an even slope. Although falls are here abundant, the volume f water is deficient, and the prevailing ruggedness of the head-water hills disadvantageous to large settlements. But the falls on rivers of drift-rraced valleys are placed at haphazard, as well on the lower trunk stream s near the head, and the glacial period is so recent that even the trunk vers have not yet extinguished their falls. Manufacturing cities situated falls near the river mouths have the great advantage of large water olume and of neighbourhood to the sea in a low and comparatively open ountry; repeated illustrations of the benefits of these favouring circum-tances might be named. The lakes are also of practical value as natural eservoirs by which the volume of the lower stream is rendered relatively

constant. Many lakes are dammed at their outlets, and in a dry season t volume of the failing river is maintained by opening the flood gates. the absence of important agricultural resources, New England has turn so largely to manufacturing that even its abundant water powers do n suffice for its needs. With little or no water power, *Worcester* and *Pro dence* produce machines and tools. *Lynn* and *Brockton* are "shoe towns *Waterbury* makes brass ware and clocks, and *Danbury* makes hats. T goods from these active centres find a market, though with increasi competition, in all parts of the country.

Cape Cod and the Outlying Islands.—The most extensive morain of the New England region are those that mark some of the furthe advances of the ice sheet on the southern coast and on the outlying islan of Long Island, Martha's Vineyard, and Nantucket. A foundation of Cret ceous and Tertiary strata, similar to those of the coastal plain of Ne Jersey and beyond, but much deformed and denuded before the last i advance, constitutes the preglacial structures from Long Island to Ca Cod. Belts of morainic hills with numerous boulders increase the relief a hundred feet or more, giving a pleasing undulation to the surface. Bro plains of washed gravels extend southward from the moraines to the se now more or less cut back in the cliffs, as on the east side or "back" Cape Cod; or fronted with long sand reefs, as along the southern bord of Long Island (Fig. 356). In the eighteenth century, when the travel from Boston to New York went more comfortably by sailing pack than by land, even the outermost island of Nantucket was not t out-of-the-way place that it is to-day; and for some time after overla travel was established a thrifty Quaker stock and an active whali industry made the island prosperous; but when whales became scar and when rock-oil replaced whale-oil, the trade and population *Nantucket* dwindled, its wharves decayed, some of its houses were carri away to the mainland, and it was almost in danger of being deserted, un in recent years when its value as a quiet summer resort was recognise *Provincetown*, a land's end village on Cape Cod, is peculiar in containi a colony of Portuguese, the families of fishermen and sailors. Here on great wave-built spit, covered with sand dunes, the Pilgrims first lande but seeing the morainic hills of Manomet across Cape Cod Bay, they sail on and founded Plymouth, where the famous rock on its shore is only glacier boulder of modest size, too small to be chipped off for keepsa by the many descendants of the Pilgrims.

Gateways to the Interior.—The narrowing of the Older Appalachi belt between New York City and Washington, due to ancient subsid of a part of the ranges, has been of great importance in determining po of entrance of immigration towards the vast Mississippi basin; for nea all the many thousand emigrants from Europe have reached the inte by gateways through this least formidable part of the mountains. The can be little doubt that the important commercial cities of New Yo

iladelphia, and Baltimore owe their growth to the easier access thus owed to the interior of the country behind them. Ports like Providence, ston, Salem and Portland, further north, and ports like Norfolk, ilmington, Charleston and Savannah, further south, chiefly serve local eds; they cannot compete in international traffic with the three inter-diate cities, of which Boston and Norfolk are the only important rivals. ie pre-eminence of New York among the middle ports is dependent rily on its good harbour, partly on being nearer Europe than the ports ther south, and much more on the navigable waters of the Hudson that ich inland almost across the Appalachian Belt.

The Newer Appalachian Belt.—The last point may be better preciated after a fuller account of the Newer Appalachian Belt (N A Fig. 353), whose inter-ridge lowlands are worn down on the weaker læozoic strata. They extend from the Gulf of St. Lawrence (beyond the ritory of the United States) along a curved path past New York to Alabama, d there disappear under the overlapping strata of the Gulf coastal ain. In the north the newer belt is limited on the inland side by the urentian plateau of Canada, and by an outlying area of similar structure d more rugged form, known as the Adirondack Mountains, in northern ew York. From Albany to Alabama, the inland boundary of the ridge-and-lley belt is formed by the escarpment of the Allegheny plateau. In New rk the ridges are few and the lowland is broad and open, but from New rsey to Alabama, long, narrow, even-crested mountains of curious zigzag ttern, 1,000 to 3,000 feet high, formed on the outcropping edges of sistant sandstone layers, are very numerous. They divide the lowlands o many compartments, with difficulty connected by roads over the ountains, but open to one another where rivers have cut transverse tches or water gaps. The ridges are highest in Virginia, where some of e crests rise to 4,000 feet; and here most of the valleys between them e so narrow and deep as to be of small value for settlement. Much of e better timber has been cut from the ridges, but they are still left to rest growth, for their slopes are cloaked with coarse, slow-creeping ocks of sandstone, the waste of the ridge-making strata.

The valley floors between the ridges are sometimes underlain by lime-one, especially along the eastern border of the Newer Appalachian Belt; re the rich soils are occupied by some of the best farms in the country, beit they have not the unlimited expanse of those on the western prairie. *rrisburg*, the capital of Pennsylvania is in the midst of these thrifty rroundings. Beds of anthracite coal and plentiful deposits of iron ores long the ridges of Pennsylvania have contributed greatly to the wealth e Keystone State—so called from being the middle one of the thirteen lonies in the time of the Revolution. Mining industries have here racted colonies of European labourers, where foreign languages are en more prevalent than English. The iron ores of the southern part of e belt, near the coal-fields of the plateau on the west, have been an

important factor in the development of the "New South" since the Civ War; the centre of the iron industry in Alabama having ambitiously take the name of *Birmingham*.

The continuity of lowland along the eastern side of the Newer Appa lachian Belt has given this part of its floor the general name of the Gre Appalachian Valley; it is locally known as the Hudson Valley in New Yor the Kittatinny Valley in New Jersey, the Cumberland Valley in souther Pennsylvania, the Shenandoah Valley in Virginia, and the Valley of East Ten nessee. The Great Valley is peculiar in being drained by a number of inde pendent rivers that find exit through the deep gorges cut in the uplands o the east or west. Exceptions to this rule are seen in the longitudinal escap of the St. Lawrence with its branch from Lake Champlain in the north east, and of the Coosa in the south-west; both of these rivers run ou lengthwise at the extremities of the valley. The Hudson, Delaware Schuylkill, Susquehanna, Potomac and James all rise in the valley, or o the plateau to the west of it, and reach the Atlantic through steep-sided narrow gorges in the uplands of the Older Appalachian Belt. The New Kanawha and the Tennessee rise in the Older Appalachians of North Carolina, and escape westward through deep gorges in the Alleghen plateau to the Mississippi system and the Gulf. It is interesting to not that the six Atlantic rivers all cross the Old Appalachian Belt in or near i low and narrow middle part; their valleys serving as so many entrances t the interior, and thus emphasising the contrast already noted between th lower middle and the higher terminal districts of the Atlantic highlands.

Transverse Valleys in the Old Appalachian Belt.—The physica relation between the lengthwise lowlands of the Great Valley and th transverse gorges by which its rivers escape has been generally misunde stood. The broad lowland and the narrow gorges are the work of erosio in the same period of Tertiary time. The rivers had much the same patter as to-day when all this region had about the altitude of its uplands and ridg crest. Since then the excavation of the broad inner valley and the incisio of the narrow gorges have gone on together: indeed, the incision of th gorges on the transverse course of the several rivers in the harder rock of the Older Appalachian Belt was the essential antecedent to the deepeni of their channels in the weaker rocks of the newer belt; but while th gorges have widened very slowly in the harder rocks, the weaker strata the inner belt have, as it were, melted away under the weather, and the inn valley has become as broad as the belt of weak strata that guide it. Sin the general form thus described was developed, a moderate uplift of th region has again set the rivers at work, and they have cut narrow trench e in the valley floors.

The Hudson and St. Lawrence are unlike all the other rivers of th Great Valley in having their valleys partly flooded by sea water, in co sequence of the moderate depression of the northern lands already me tioned in describing the bays of the New England coast. The lower St

Lawrence is thus broadly expanded into a funnel-shaped bay, misnamed a gulf ; but the drowned Hudson is closely hemmed in by the steep walls of the highlands. It thus retains the appearance of a river, although its volume is by no means an appropriate measure of the rainfall on its basin. It is a deep navigable waterway, open to large vessels to the head of tide at Albany and Troy, 150 miles from New York. It is the only deep-water passage through the Atlantic highlands ; and on this fact chiefly depends the metropolitan rank of New York City among the Atlantic seaports. The northward extension of New York Colony and State, from its first settle-

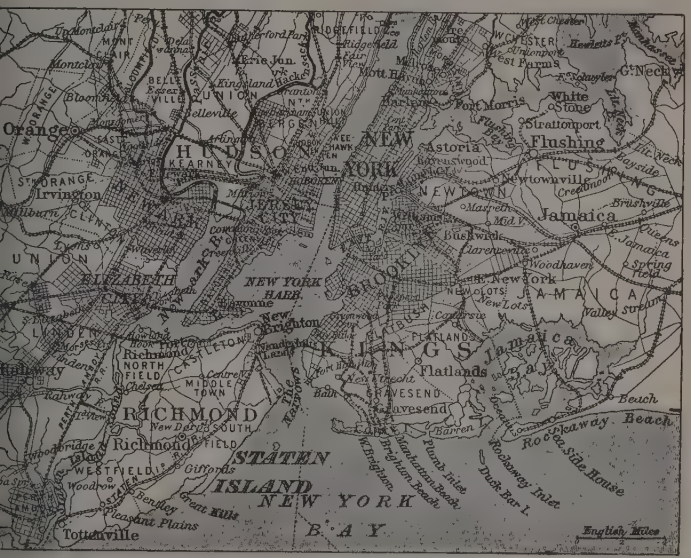

FIG. 356.—*The Site of New York City.*

ment at the mouth of the Hudson, repeats the northward extension of Virginia and Pennsylvania from the colonies on their lower bays. Just as the latter colonies claimed possession of long belts of territory westward to the Pacific, and thus confined Maryland, Delaware and New Jersey to small areas, so the former claimed control of all the land west of the northern Older Appalachians, and thus determined the small dimensions of the New England States. Had the Potomac been drowned, not only in its course across the coastal plain as far inland as Washington, but through its gorge in the Blue Ridge to Harper's Ferry, Norfolk might have tried to rival New York City ; yet, even then, the upper Potomac would have had no

branch valley comparable to that of the Mohawk, by which, as will b shown further on, New York City has so greatly benefited.

New York, Philadelphia and Baltimore.—The relation o *New York City* to the interior of the United States has determined its relatio to Europe. Commercialism is here supreme. The banker, the broker, th importer, and the railway director are the leaders of business activity Standing as the chief port of entry for commerce and immigration, th city has gathered colonies of all the peoples of Europe. Germans, Frenc Italians, and many other nationalities here group themselves together, pre serving their foreign ways even to the second generation; much concer is felt by the sociologist over so congested a population. The governmen of the city is one of the most difficult of political problems, and it has b no means been made easier by the recent consolidation of Brooklyn an other independent municipalities in "Greater New York." The profes sional politician and the "boss" accomplish their selfish ends by mos elaborate and successful management of the people. The narrow islan between North (Hudson) and East rivers has become inconvenientl crowded; elevated railroads, running to the northern suburbs, make th streets resound with their many trains, although the New Yorkers seem t accept the noise as a proper part of the bustle of their great city. A hug suspension bridge connecting New York and Brooklyn very imperfectl accommodates the crowds that throng it morning and evening.

Philadelphia has been favoured in another manner. It began with th thrift of the Quake followers of Willia Penn; it has profite from the presence o many industrious Ger man immigrants on th rich farming lands o the Great Valley, nea at hand; it has had commercial advantag in being the southern most Atlantic port i the non-slaveholdin States. Furthermore has had great physic advantage from abu dant open ground which to expand,

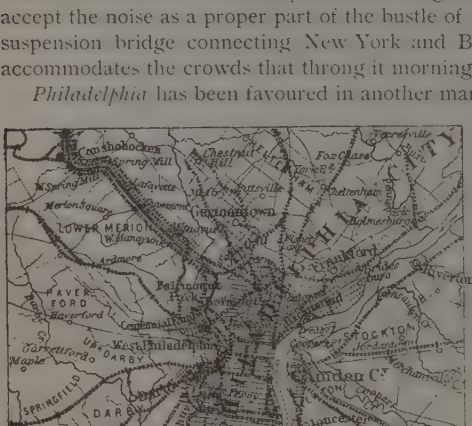

FIG. 357.—*The Site of Philadelphia.*

that the proportion of houses to families is very large; from th water power of the Schuylkill, whereby it has come to be a gre manufacturing city; and from the small altitude and width of the Old Appalachian Belt in the background, so that the communication wi

e interior of Pennsylvania has been comparatively easy. The uplands e narrow here because of the strong overlap of the coastal plain. ney are low, because they have been but little uplifted since they were orn down in Cretaceous times ; but more than this, they happen here to clude a tract of weak Triassic sandstones and shales (like those of the onnecticut valley and the Bay of Fundy), which occupies a large part of eir small breadth, and indeed obliquely traverses them from east to west. ie sandstones and shales are now worn down to a lowland, like the Great lley next adjoining on the west. Nowhere else are the Older Appalachians inconspicuous as here. Indeed, if traced by the empirical guide of ight instead of by their geological composition and their physical cha-cteristics, they might be overlooked, as has often happened in geo-aphical descriptions. Extensive railroad systems connect Philadelphia th the coal-fields of Pennsylvania, and with the Ohio Valley ; but so eat is the importance of New York, that all these roads now continue eir trains past Philadelphia to the metropolitan city (see Fig. 336).

Baltimore is practically the civic representative of Maryland. In con-st to Philadelphia, it is the northernmost commercial city of the south. is physically the result of the far inland reach of Chesapeake Bay, and of e access to the further interior afforded by the valleys of the Potomac d Susquehanna rivers. The bay brings in ocean-going vessels and velops international trade, as well as supporting an active fishing dustry ; oysters being included under fisheries on commercial rather an zoological grounds. The Potomac valley leads a great railroad from e harbour city towards the Ohio region ; but the difficulties encountered crossing the Allegheny Plateau and the comparatively small population the way, have made is line less successful ancially than the chief ilroads further north. ducationally, Baltimore s in Johns Hopkins, the uthernmost university wide resort, as Boston s (in its suburb of mbridge) Harvard, the rthernmost great uni-rsity ; the latter is an tgrowth of an early lonial beginning in 1636. It is noteworthy that

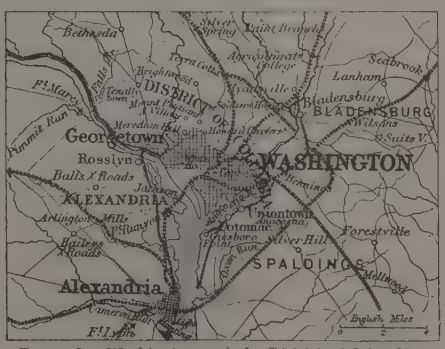

FIG. 358.—*Washington and the District of Columbia*

e three great commercial cities just described are not the capitals of their ates. The State governments have their seats in Albany on the Hudson, arrisburg on the Susquehanna, and Annapolis on Chesapeake Bay. *Vashington*, whose situation on the lower drowned Potomac corresponds

to that of Baltimore on Chesapeake Bay, is purely a governmental ci
The great water power of the Potomac, where it runs from the
Appalachian Belt to the Coastal Plain, is not yet utilised for manufacture

THE ALLEGHENY PLATEAU

The Allegheny Plateau (A P in Fig. 353) is the westernmost divis
of the Atlantic highlands. It retains much of the forest which origina
covered nearly all the region east of the Mississippi and south of the Ol
Its altitude ranges from 2,000 to 4,000 feet. It extends as far south-west
the mountain belt, and like it disappears under the coastal plain of
Gulf. It is terminated on the east by a strong escarpment, known
Allegheny or Cumberland Mountain in different parts of its front; but
the west or north-west it as a rule decreases in height gradually, and th
merges into the prairie region of the Ohio basin. On the north-east,
plateau is known as the Catskill Mountains, overlooking the Hudson a
Mohawk valleys. Throughout this extensive region, the same great ser
of Palæozoic strata that is broken, tilted, and folded in the mountains
the Newer Appalachian Belt, lies nearly horizontal. Productive coal-be
underlie most of the surface. The well defined north-east and south-w
trends that prevail in the uplands, ridges and valleys of the Appalachia
are here exchanged for a systemless maze of digitate spurs dissected
repeatedly branching valleys. The greater part of the region is drained
branches of the Ohio, of which the most interesting is the Kanawha, whe
canyon, 1,000 to 1,500 feet deep, is the strongest river valley in the easte
part of the country. The Kanawha is furthermore remarkable in havi
maintained its course to the Ohio against an arching uplift of the plate
in late geological times, whereby the district traversed by its middle wat
was elevated about 1,000 feet more than that about its upper waters;
in spite of this discouragement, the river cut down its channel and he
to its former path; thus acquiring a right to membership in the interesti
class of antecedent rivers. There is not another river in the wh
Appalachian region that so well preserves its ancient course.

The Southern Plateau.—Beginning on the south-west, as it emer
from the southern coastal plain, the features of the Southern Plateau m
be called coarse-textured, inasmuch as tablelands that measure seve
miles across rise between broad-floored valleys. Here the uplands
known as the Cumberland Plateau or Tableland, for the most part a fores
wilderness. Although containing great stores of coal, there has been li
mining until within recent years, in the return of prosperity to the south
States after the civil war. The plateau is peculiar in falling off on
north-west by an escarpment almost as strong, but much less straight th
that by which it is limited on the south-east. The surface thus desce
as if by a great step to a platform of less elevation, underlain by limestone
here occur the numerous caverns of Tennessee and Kentucky, of which
Mammoth cave is the most famous. Further to the north-west the platfo

underlain by sandstone, furnishing an infertile soil, and discouraging an poverished population, in remarkable contrast with the fortunate occu- nts of the limestone lowlands next beyond, the famous Blue Grass untry of Kentucky and the less known but equally fertile Nashville basin Tennessee (B G and N in Fig. 353). Looking back from the extensive ms of the limestone lowlands, one sees a wooded bluff, several hundred t in height, known as the Highland Rim. It was from a point on that t of the rim known as Muldraughs hill that Daniel Boone, late in the hteenth century, first saw the beautiful lowland that his followers cled, and thus founded what afterwards came to be the State of Ken- ky.

The Middle Plateau.—The middle part of the plateau, in eastern ntucky and West Virginia, reaches altitudes of 3,000 and 4,000 feet, so t its dissected uplands fully deserve the name of mountains, by which y are locally known; and the people appropriately call themselves ountaineers." As in Tennessee, the region is a great forested wilder- s. The separate uplands are seldom broad enough to support more n a small community; often not more than a single family, who find hard and lonesome. Farming is unprofitable, for most of the surface sists of steep hillside slopes, belted around with contouring sandstone ges; if the forest were cleared and the ground ploughed, much of the would soon be washed away. Roads are rough and steep, badly shed by heavy rains; to keep them in good condition would cost large ns of money, far beyond the means of the county treasuries. The leys are deep, and their narrow floors are exposed to destructive floods t rise suddenly in wet weather. Bridges are an expensive luxury that y the more important highways can maintain: when streams cannot be ded in time of high water, travel is for a time suspended. The railroad t follows the deep canyon of the Kanawha through the plateau brings lower lands on the east and west into close connection, but it has little ct on the people among the hills. Even the branch lines that carry out l and lumber leave the greater part of the plateau country untouched untamed. The people still live in primitive log houses; hand looms no rarities; wild game is almost as important a food supply as garden duce; the rifle is as familiar as the spade. Feuds are kept up for years ween rival families, and personal differences are settled by an appeal to ns rather than to the courts.

The Northern Plateau.—A less altitude prevails in the plateau within limits of Pennsylvania, where 2,000 feet will measure most of the and heights. Here a greater degree of settlement has accompanied the ler development of the great natural resources of the region, both of se advances being promoted by the neighbourhood of the great manu- turing communities, at first in the north-east, and afterwards in the north- st as well, where a ready market is found for the bituminous coal, the k oil or petroleum, and the lumber of the plateau. Railroads are nume-

rous and monopolistic corporations dominate the politics of the Sta
Pittsburg has attained an altogether unusual population for a city in t
plateau district; it was favoured at first by its situation at the junction
the head branches (Allegheny and Monongahela) of the Ohio, down whc
ample current so many early settlers of the western prairies found ea
transportation; later by the marvellous development of industries and ra
roads in the second half of the nineteenth century. It is now one of t
greatest manufacturing centres in the United States; the ironworks in a
near the city are the admiration of the technical world.

The north-east extremity of the plateau, known as the Catskill Mountai
contains summits as high as those of West Virginia. No mineral produc
of value, other than too abundant building stone, are found here; hen
the mountains remain thinly populated, and are chiefly noted as a summ
resort for the crowded population of New York City. Further west, alo
the southern borders of New York State, the plateau is less elevated, a
its rolling uplands and open valleys contain an agricultural populatio
It happens that this portion of the plateau contains no coal, and co
paratively little rock oil; the productive fields being almost entirely sou
of the Pennsylvania boundary.

Outliers of the Laurentian Highlands.—The rugged Adiro
dack Mountains of northern New York, and the highlands of northe
Wisconsin and Michigan are outlying representatives of the Laurenti
highlands of Canada. They consist of extremely ancient rocks, for t
most part thoroughly indurated and very resistant. Although the
structures are greatly disordered, their relief is of moderate measure
in the Adirondacks, the highest summit, Mount Marcy, is but little mo
than 5,000 feet above sea-level, with valleys one or two thousand feet dee
around it; in northern Wisconsin, the altitude of the highlands is not
great, and their local dissection is much more gentle. Both of these a
forested wildernesses, unattractive to the farmer, but tempting to t
lumberman. The ancient rocks contain valuable stores of iron ore, le
important in the Adirondacks than in upper Michigan, where they a
extensively mined and shipped down the Lakes to furnaces near the co
regions. The uplands bordering on Lake Superior are peculiar in conta
ing deposits of native copper, unknown elsewhere in the world. T
Adirondacks are separated from the Laurentian region by an anci
trough that has been filled with Palæozoic rock layers and re-excavated
comparatively modern geological times. It is followed by the St. La
ence river, an important waterway, but so young on its present cour
that in spite of its great volume, many rapids still interrupt its chann
The Wisconsin-Michigan uplands (O L in Fig. 353), are separated fro
the Laurentian plateau in Canada by the broad and deep trough of L
Superior of uncertain origin, but of great value as a member of the va
system of inland waterways by which the wheat of the north-west, th
ores of the uplands, and the lumber from the forests are carried to th

re populous States. The outlet of Lake Superior is interrupted by ids; hence its name, the Sault (pronounced *Soo*) Ste. Marie. These are sed by a canal that has been constructed around them on the southern e (see Fig. 344); the tonnage passing through this canal rivals in antity, although not in value, that of the Suez canal.

The Adirondack region, and to a less degree the highlands of Wisnsin also, serve as camping and hunting grounds in the summer vacation son, when civilised man seems to enjoy a temporary return to the der ways of his remote ancestors.

THE OHIO REGIONS AND PRAIRIES

The Ohio Region.—The region north of the Ohio and east of the ssissippi is one of the most valuable parts of the United States. The face is of moderate relief, nearly everywhere open to occupation. The l is rich, the climate encouraging. Into this magnificent territory has ured a tide of immigration during the nineteenth century with which the tory of the world has no parallel. The struggles for the acquisition of land were practically completed before the century opened; struggles which the stronger invaders repeated too often the harsh treatment that igher race inflicts upon a lower, but which nevertheless lead forward to ogress in the end. The northern Atlantic States, as well as the countries north-west Europe, furnished hundreds of thousands of able-bodied rkers under whose hands the Ohio basin region has grown to marvellous oductiveness, activity, and wealth, fully warranting the opinion of Lewis ans of Philadelphia in 1750, when he urged Great Britain to gain ssession of this "great extent of good land in a happy climate," arguing t whatever nation wins it must inevitably gain the balance of power on continent.

The Ohio Region as an Ancient Coastal Plain.—The physical tures of the Ohio region are best explained by regarding it as an ancient astal plain, skirting the older Laurentian lands of Canada and their outrs in the Adirondacks and the Wisconsin highlands. Travelling thward from the rugged Laurentian highlands of Canada on the ridian of Niagara, a traveller would see the rugged country merge into fertile lowland of Ontario, partly submerged under the lake of that me; all this low ground being an "inner lowland" worn down on the ak under layers of the ancient coastal plain. Crossing to Niagara, the cent of a bluff or escarpment of strong limestone, two or three hundred et in height, makes a distinct break in the general smoothness of the wland and leads to a broad upland, which then gradually slopes southrd to the trough of Lake Erie, a second lowland underlain by weak ata, and in turn enclosed by the hills that form the northern border of e Allegheny plateau. Thus two inner lowlands and two uplands form lts along the border of the Laurentian country; and the rest of the Ohio gion may be described in terms of these elementary forms.

The Mohawk Valley.—Following the fading Niagara escarpm eastward beyond its disappearance near Rochester, one sees the two l lands of Ontario and Erie blend into one, forming the rich farming cour of western New York; then narrowing as the Adirondacks come forw from Canada and thus define the Mohawk valley between their south slope and the escarpment of the Helderbergs, which here forms the no eastern extremity of the Allegheny plateau. It is the confluence of Mohawk valley with the navigable tidewater of the Hudson that ope the Great West to the port of New York City. At first an Indian trail, t the path of the frontier settlers driving their waggons up the valley r next the course of the famous Erie canal whose construction in the half of the nineteenth century was a fit achievement for the Empire St now followed by important railroad lines, the Mohawk valley was alw a leading line of movement between the east and west. There can little question that the port that stands in closest connection with eastern end shall long be pre-eminent on the Atlantic coast. It is t that Philadelphia stands nearer the Ohio region, and that the great rail leading thence to Pittsburg and beyond has the advantage of least distan but its way leads over the Allegheny plateau where gradients are hea It is true that a shorter railway has been constructed from New Yor Buffalo than that which follows up the Hudson and the Mohawk; but shorter line crosses the Allegheny plateau where it is broader than Pennsylvania, and it has had to pay dearly for its defiance of nat pathways; indeed, had English investors known more of the form of land when this venturesome road was projected, they would not h become so largely its owners. *Binghampton* and *Elmira* are the c considerable cities on its way among the hills; while the Hudson val the Mohawk valley, and the southern border of the Ontario lowland incl a much greater population in *Newburgh, Poughkeepsie, Albany, T Schenectady, Utica, Syracuse, Auburn* and *Rochester.*

The Great Lakes and the Prairies.—In tracing the Ohio re westward, it is interesting to note the relation of its belted lowlands uplands to the basins of the Great Lakes and to the path of the in national boundary. The northern border belts of the Ohio region neither straight nor persistent; they vary greatly from the type section the Niagara meridian. The basins of the Great Lakes exhibit a c relation to the lowland belts. Ontario, Georgian Bay and Green Bay the west side of Lake Michigan) occupy depressed parts of the inner land; Erie, Huron and Michigan occupy corresponding parts of second lowland. Between the lakes, the lowlands offer excellent far districts. The upland of the Niagara limestone, between the two low belts, with its bluff looking across the inner lowland towards the ru old Laurentian land, may be traced with varying strength even beyon Mississippi; it is of moderate height, and is not rugged enough to courage settlement. Its course (N on Fig. 353) leads north west a

Province of Ontario to the belt of islands that divides Georgian Bay Lake Huron; westward through the eastern arm of upper Michigan e; southward through eastern Wisconsin in the ridge that divides en Bay from Lake Michigan; and then curves through northern ois into north-eastern Iowa. Artesian wells afford an abundant water ply in this ancient coastal plain south of the Wisconsin highlands. The gheny upland, bounding the lowlands in southern New York, fades y westward in Ohio; an isolated upland, coal-bearing and forested like Allegheny plateau, but subdued in form, occupies lower Michigan ween Lakes Huron and Michigan. The lumber from this region has to the growth of the city of *Grand Rapids*, where household furniture is ely made.

It is but natural that the international boundary should have followed manifest line of the lakes and rivers, rather than the more irregular and distinct line that marks the inner border of the ancient coastal plain; if by thus departing from one physical guide for another the United es have lost peninsular Ontario, they have gained the great mineral osits of the upper Michigan highlands. It should be remarked that e Superior is unlike the other lakes in being unrelated to the belts of ancient coastal plain. Its basin is an anomaly, a puzzle to the morphologist, who has not yet been able to give a good account of it. basin must be of recent origin, for if ancient, it would long ago have n filled with sediments and converted into a plain.

The hills of the Allegheny plateau are not seen in Ohio west of Cleve- d; and with their disappearance a broad expanse of country opens ards the Mississippi, originally wooded in the east, a treeless prairie ther west. This great extension of the Erie lowland is now divided the States of Ohio, Indiana and Illinois. Little wonder that the early ners of the rugged New England hills sent their sons out to this nderful farming land of deep and rich soil. Little wonder that such he European immigrants as did not stop in the Atlantic cities passed uplands of the Allegheny plateau before settling upon their new nes. Little wonder that those who found so bountiful a welcome on prairies, became Americanised in the first generation; never has so nposite a population been so rapidly unified. With free movement, h rapidly growing population, with wonderful increase in wealth, one e sees few of the old-fashioned ways of living that still remain in the closed valleys of the Atlantic highlands. The rough cabin or log house s usually replaced by a well-built frame cottage within the life of the t settler; and his sons and grandsons, leaders in the growing com- nities, often occupy mansions of some pretension, albeit their architecture dom follows classic lines.

The rivers at first served as important lines of travel and transportation. e growth of *Cincinnati* was for many years as much dependent on the de that followed the Ohio river as on the rich farming country that

surrounded it. Canals were cut between the headwater branches of t
Ohio and Mississippi and the waters of the Great Lakes; the lakes the
selves, consecrated to peace after the war of 1812, lie with extended sh
lines along the northern border of the great fertile country, and a wh
series of important cities has been built on their southern side—Buff
Erie, Cleveland, Toledo, Detroit, Chicago, Milwaukee. But important as
rivers have been and as the lakes are still, it is to the marvellous develo
ment of railroads on the level prairies that the industrial and commerc
activity of the region is most largely due. Distance is their only obsta
and that they overcome by building single tracks; they have few cutti
or embankments, they cross each other on the level, and gather in tang
ganglia in many prairie centres like Columbus, Indianapolis, and Spri
field. An open country, occupied by a few Indians a century ago, h
suddenly become populous and rich, and the manufacturer and the ra
road magnate take the place of the feudal baron of Europe.

Glacial action in the Ohio region.—Various geographical featu
have already been traced backward to their origin in past geologi
processes, and forward to their control over human distribution a
occupations. This phase of geographical study nowhere receives mo
striking illustration than in those elements of form that have result
directly or indirectly from the action of the ice sheets of the glacial peri
It has been too generally the custom to set such subjects aside, as if th
belonged only in the province of the geologist; but in the Ohio region
in New England events without number, great and small, from trifli
matters of individual action to momentous problems of national importan
have turned on the geographical results of ice action. Once recognis
their meaning cannot be neglected. The soils on which the richness
the Ohio region depends are almost wholly of glacial origin. Smoo
sheets of till were spread out under the invading ice sheet where it co
drag along no further the rock waste that it brought from nearer
source; still smoother sheets of silt were deposited in various margi
lakes, large and small. Sheets of loess, ascribed to wind action by ma
observers, to turbid fluviatile waters by others, are found in the sou
western part of the district, and reappear in greater force beyond t
Mississippi. Far from being a destructive agency, the ice sheets and th
associated processes were here largely constructive; they buried the p
existent topography, extinguished the pre-glacial drainage, and made
surface over anew. The soil of the till plains is more or less stony; t
of the silt and loess plains is almost impalpably fine. All are rich so
for they consist in greatest part of pulverised rock, not exhausted
vegetable growth while weathering, but worn mechanically from its par
ledges under the desert ice sheets and in the ice-fed rivers.

The plains of till, silt, and loess are so extensive and continuous, t
rock ledges are unknown for many miles together; pre-glacial hills
valleys are completely buried over large areas; it is only in the sides

ung valleys, recently cut through the glacial deposits, that the ledges are xposed. The geologist hardly knows where to draw the boundaries of ck formations ; he has to trust largely to the samples brought up from e wells and deep borings that have been made in search of oil and gas. he absence of trees on the prairies has been ascribed by some to the neness of the soil ; by others, to Indian fires. It appears probable that th these causes have had effect. The climate of the region is certainly vourable, for trees flourish when planted. On the other hand, trees are sent from the western plains because of lack of rainfall ; and the blend- g of plain and prairie west of the Mississippi has sometimes given rise to e wrong idea that their treelessness was due to a common cause.

It may now be understood how strikingly the soil and the surface of e prairies north of the Ohio differ from those further south, as in the lue Grass region of Kentucky. There the soil is of local origin and varies ith the nature of the rock beneath ; hence the sharp contrast between e fertility of the Blue Grass district and the barrenness of the adjoining ndstone uplands already mentioned. In the glaciated region, local and stant materials are well mixed ; there is generally an excess of local aterial, but it seldom prevails in such quantity as to make the soil very uch better or worse than the average. The hills of south-eastern Ohio, tside of the glaciated district, should be regarded as a part of the ssected Allegheny plateau ; but whatever hills there once were in north- estern Ohio are now buried under the drift. One part of the State has any coal mines, the other has extensive farms. In the same way southern diana and Illinois, beyond the border of the drift, exhibit local details topographic form dependent on rock structure, and accompanied by latively sudden changes in the character and value of the soils, similar to ose found south of the Ohio river in Kentucky ; the central and northern rts of these States are smoothly drift covered for scores of miles.

Corn (Indian corn, or maize) is the characteristic crop of the drift region om Ohio to Nebraska. Its growth is favoured by hot summer weather. ravelling by rail, one may pass miles and scores of miles of corn-fields aving green in early summer, dull brown or gray in early autumn. ther grains are also raised in abundance. Great herds of cattle are stured on the drift prairies, rivalling the product of the western plains. oads very generally follow the north-and-south or east-and-west lines by hich the land was originally divided for sale from the government to the eople. Road-making is generally done by a scraping machine, which rows the soil from a ditch on either side to an arch in the middle ; in et weather they have many sloughs, where waggon wheels sink hub-deep. the villages and cities vitrified brick is coming to be largely used for aving, in the absence of good road metal. Barbed wire is now almost iversally used for fencing on the treeless prairies.

The broad surface of the drift plains is here and there interrupted by oped belts of low hills, convex southward ; these are the terminal

moraines of the ice lobes into which the front of the glacial sheet w
divided; each trough of low ground on the north allowed the ice to mo
faster and further forward, while each district of higher ground, like t
Allegheny Plateau of eastern Ohio, the uplands of lower Michigan, and t
highlands of Wisconsin, retarded the advance. Although of moderat
relief, the morainic belts are usually the only hills visible over hundreds
miles of prairie, hence they commonly serve to define the subdivid
between river headwaters, although not ranking as equals in this respe
with the upland belts of the ancient coastal plain. The moraines have
moderately rolling surface, they are sometimes strewn with boulders; th
hollows contain numerous ponds and marshes.

Effect of Glacial Action on Drainage.—Rivers running from t
glaciated area bore with them an abundant load of waste, and thus bu
up their valley floors into broad flood plains; but since the disappearan
of the ice and the decrease of the waste furnished to them, the rivers ha
trenched the valley flood plains, forming terraces, and sometimes pr
ducing falls and rapids where the entrenching streams have cut dow
upon buried ledges; but the water power thus provided is much less th
in New England, on account of the small relief of the region and the slo
descent of the valley floors. The lakes which gathered on the land th
sloped towards the retreating ice sheets marked their shore lines wi
beaches, many of which are so well preserved that they are used
naturally graded roads. The outlets of these glacial lakes were at t
lowest passes across the height of land on the south. Strong rivers ran fro
the greater lakes, scouring out broad channels, now abandoned except
the waters of such small side streams as happen to enter them. A we
defined channel of this kind is incised to a slight depth across the dri
covered surface of northern Indiana, where the waters of the expande
Lake Erie (when its present outlet was obstructed by ice) ran out by th
Wabash, Ohio, and Mississippi rivers. Another channel discharged th
expanded waters of Lake Michigan to the headwaters of the Illinois riv
across the south-western border of the lake basin; there an Indian portag
was naturally found when white settlers entered the region; a militar
outpost, Fort Dearborn, was established on this travelled path early in th
nineteenth century, and there Chicago has since grown. The old chann
of overflow has been a little deepened, a current of water is drawn throug
it from the lake to the Mississippi system, and the drainage of the city
thus to be disposed of in the future.

Chicago is the epitome and climax of the prairie and lake regio
Its lofty buildings disclose a boundless prairie to the west and south, and
boundless blue lake to the east. No other city in America is the foc
point of so many lines and systems of railroads. No other lake port has
valuable a commerce. No other city in the world has grown to so huge
population in so short a time—an empty prairie in 1830; more than
million of population at the close of the century. From an idle milita

t, Chicago has risen in seventy years—the span of a single lifetime—to ensationally active market for traffic in cattle, grain, and lumber ; as the ıtre of trade for a vast region, it feeds the east and furnishes the west. e immediate site of the city had few advantages for the seat of a great ɔulation. The ground was so low and flat as to be poorly drained, and er the growth of the city had been well begun, the buildings and streets d to be raised to a higher level than that of the natural prairie. The lake ɔre was open to storms, and the little river that alone gave protection to ɔping had to be enlarged like a canal before it could admit many ssels. To counterbalance these disadvantages, Chicago stands in the dst of a vast prairie region, at a point where all overland travel from east must turn round the southern end of Lake Michigan on the way the great North-West ; and to s fact of general relations much ɔre than to any immediate local vantage has the great city owed growth. Rapid growth has not en altogether an advantage, for city that has increased in popu-ion so fast as Chicago cannot ve exercised a careful selection the choice of its new members. ke other great cities, it exhibits any of the unattractive sides of ıman nature, but from about the ne of the Columbian Exhibition 1893, various signs of better owth have appeared. The in-ımerable railroads all originally ossed each other's tracks on the vel, but the correction of this fficulty is now actively in pro-ess. The immense wealth gathered in the city has found new application the establishment of a university and a museum, whose development as advanced by wondrous strides. Already the centre of population has assed the meridian of Chicago. However important the harbour cities ay be in relation to Europe, the great interior City on the Lake promises ɔon to outrank them in all domestic relations.

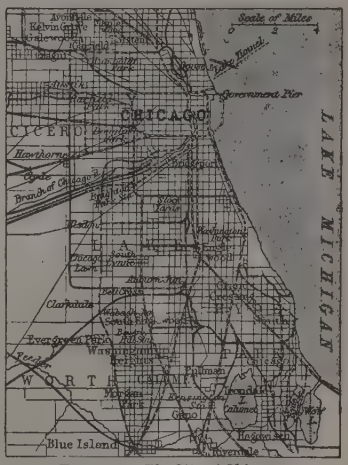

FIG. 359.—*The Site of Chicago.*

Niagara and the Great Lakes.—A whole series of events reaching ɔm the close of the glacial period past the present into the future, ssociate Niagara river, the Great Lakes, and the city of Chicago in a ost curious history. The lakes, except Superior, occupy lowlands or epressions which, as has been pointed out, are closely dependent upon ıe structure of the ancient coastal plain between the Laurentian high-nds of Canada and the Ohio prairies. Although the problem of the

origin of the lakes is still unsolved, their history during the retreat of th latest ice-sheet has been well deciphered during the last twenty years, an now offers a consecutive story of extraordinary interest and importance the geographer. As the ice withdrew from its last great advance numero small disconnected water bodies were formed along its margin; but the retreat of the ice continued, the many small lakes coalesced into a fe lakes of much larger size; and ultimately perhaps all these were reduce to a single sheet of water of very irregular outline, escaping to th Mississippi by a single outlet at the site of Chicago. This outlet w probably maintained while the ice still lay heavily on the lands to th north-east; but as the ice front withdrew, lower outlets were offered, fir eastward by the Mohawk to the Hudson, then north-east by the S Lawrence as to-day. As the change from the southern to the easte drainage was approaching, a considerable river ran along the troug defined by the northern slope of the Allegheny Plateau in central Ne York, and the southern slope of the ice front; this being known by th channels cut across the spurs of the plateau in the neighbourhood Syracuse, where they are conspicuous features. Later on, when th eastern discharge was fully established, and the Chicago outlet wa abandoned, the great marginal lake was divided into a larger western an a smaller eastern part by the Niagara upland between the Erie and th Ontario basins; the latter overflowing down the Mohawk while the ic still filled the St. Lawrence valley, and afterwards sinking to a lower lev when the St. Lawrence valley was opened. Several lines of discharge fo a time flowed northward across the Niagara upland, and fell down i north-facing bluff into the lowland beneath; but of these only the Niagar river has survived; its fall has now been worn back nearly seven mil from its original position.

During all these remarkable changes the land was slowly rising in th north-east, as if relieved of the weight of the ice by which it had been fo a time depressed; this being known by the gentle north-eastward ascen of the earlier lake-shore lines. The change of level thus brought about ha much influence in determining the location of the successive lake outlet As the ice sheet uncovered the lowlands of south-western Ontario, a line discharge was opened eastward from Georgian Bay at a lower level tha the roundabout flow through Lake Erie; and for a time the upper lak were allowed to discharge directly eastward. During this interval on Lake Erie fed Niagara, and the part of the gorge then cut by the reduce river is much narrower than that of earlier and later dates. As the la rose in the north-east, the path of the discharge eastward from Georgi Bay became too high for the lake outlet; hence the waters of the upp lakes again ran round through Erie, Niagara was restored to the fu volume which it has since maintained, and the gorge was cut to full wid again. A consequence of the variation in the width of the gorge is se in the position of the two great railroad bridges by which it is crosse

ey are close together, spanning the narrow portion of the gorge that was
t while the volume of the Niagara was diminished by the diversion of
e upper lake waters to the more direct outlet across the Ontario district.

The rise of land in the north-east not only turned the discharge of the
per lakes back to Erie and Niagara, it raised all the lake waters on their
uth-western shores; thus a number of little valleys were flooded into
ys, furnishing harbours such as that which determined the location of
ledo at the south-west end of Lake Erie. By a similar movement, the
ater at the southern end of Lake Michigan has been raised again from
e level that it must have had while the land was lower in the north-east
d the eastward outlet was maintained from Georgian Bay; thus the
ichigan waters have returned very nearly to the level of the earlier time,
hen the northern end of the lake was blocked by ice, and the outlet ran
uth-westward past the site of Chicago. Not only so; the rising of the
nd in the north-east and resulting change of water levels still continues,
d at a rate rapid enough to be discovered in the brief period during
hich accurate measurements have been made of the lake waters. An
amination of a number of authentic records by Gilbert has shown that
ere is a tilting of 0·42 feet in a hundred miles in a century. If continued,
e backing up of the waters on the southern end of Lake Michigan will
much faster than their lowering on account of the work of Niagara in
earing down its falls; and in two or three thousand years all the lakes
t Ontario will again be tributary to the Mississippi river.

The Upper Mississippi River.—No one can say where the source
the Mississippi River lay in pre-glacial times. Its present head in Lake
asca is not determined by the long and slow adjustments characteristic
river sources in mountainous regions, such as the Older Appalachian
elt of North Carolina, but by the accidental position of a small lake in
morainic region. Its upper course strays across a comparatively open
untry, guided as much by the irregular deposits of drift as by the
rm of the underlying rock. It has incised a narrow and shallow valley,
t is still too young to have worn down its many falls and rapids.
ttlements have sprung up at many of the water powers thus determined.
he most important of these is *Minneapolis*, at the lowest and the largest
the falls, those of St. Anthony, now famous for driving extensive flour-
ills, where much of the wheat of the north-west is ground. Between the
ighbouring cities of Minneapolis and St. Paul the narrow valley of the
ung Mississippi joins a broader valley now occupied by the Minnesota
ver, but formed by the large overflow of the glacial Lake Agassiz. The
oader valley is thenceforward followed southward, *St. Paul* standing on
s border at the head of navigation; and thus the "twin cities," too close
gether for the needs of the region, are forced into an over-active rivalry.
ake Pepin, a short distance below St. Paul, is an expansion of the
ississippi caused by an abundant deposit of drift that was washed into
e valley by the Chippewa river from the north-east, probably at a time

when the volume of the latter was enlarged by contributions from t melting ice sheet. Further on, the river generally possesses a flood pl a few miles in width, bounded by strong bluffs which ascend to the rolli prairie; here the valley probably follows the course of the pre-glac Mississippi; but occasionally the river trough is much narrower, as if t pre-glacial course had been obstructed by drift, and a new course had be carved in post-glacial time. Masterful as the river is, it cannot pretend great antiquity. It is the modern representative of an ancient river, but departs in many ways from the habit of its predecessor. A number thriving cities of moderate size—*Dubuque, Davenport, Burlington, Quin* —are built on the valley floor or border; their first advantage comi from the great north-and-south waterway; but to-day the river is of lit importance as compared to the railroads running east and west. Inde the river is now more of an impediment from having to be bridged, th an advantage as a public highway.

The Ohio River. — The Ohio and its northern branches resemb the upper Mississippi system in many ways. Its trunk stream is now e enough to have opened a good flood plain between the enclosing hills. T head waters rise on drift barriers, by which the pre-glacial drainage syste has been greatly modified. Many valleys that formerly discharged to La Erie are now blocked by moraines, and turn part of their waters to t Ohio. There is growing reason for the belief that a number of strea from as far south as the West Virginia plateau originally ran northwa across Ohio to Lake Erie; that an ice blockade of their lower (northe courses in an early epoch of the glacial period caused them to rise in lak and overflow westward across the hills at the lowest passes they cou find; and that in this accidental way the upper and middle Ohio vall was developed. If so, this river, by which so many settlers found th way to the prairies, is an indirect consequence of glacial action, like t water powers on which the manufactures of New England at fi depended. Only the southern branches of the river can lay claim to gr antiquity. *Cincinnati* and *Louisville* are the chief cities on the mid Ohio; both profiting more largely to-day from the rich agricultural distri behind them, and from the railroads that lead across country, than fr the rivers to whose advantages their location was originally due. C and lumber is still floated down the river from the hills of the Allegh Plateau; but the large river steamboats and their voyages from Pittsbu to the Mississippi are almost things of the past. Small river-boats to-d have a share of local traffic, but the railroads absorb nearly all the lo distance transportation.

All these rivers are subject to severe floods, those of the Ohio be especially disastrous; many of its branches, especially in the plat district, gather rainfall rapidly from their steep valley sides. No lakes present to equalise their discharge, the Ohio being strongly contra with the St. Lawrence in this respect. A destructive rise of from fort

y feet, submerging the whole valley floor, and drowning the streets of ny a village, must be expected once if not oftener in a decade.

The Climate of the Ohio Region.—Cold winters and hot summers, h an equable distribution of rainfall through the year, are the leading tures in the climate of the Ohio region. The hot summers are so ductive that the cold of the winters is easily survived. The position he region between the warm Gulf of Mexico on the far south, and the n plains of Canada on the far north-west, gives an unpleasant violence ts weather changes. The light southerly winds that prevail in front cyclonic areas in midsummer cause excessive temperatures with high nidity under a hazy sky; prostration from sunstroke is of common urrence in the cities during these spells of true "sirocco" weather. e Atlantic cities are subject to the same affliction, but seldom of so great erity as on the prairies. As the cyclonic centre passes eastward, the d shifts to west or north-west, the sky clears to a bright blue, and the perature falls to a moderate degree. Violent thunderstorms and nadoes often mark the transition from one weather type to another. In trast with these excessive heats of summer and their cool waves are mild southerly winds of winter and their cold waves; the latter are rcing blasts that sweep suddenly down from the Canadian plains, ucing the temperature to zero or lower, and causing sudden frost after thaw of the southerly winds. Like the warm waves of summer, the d waves of winter reach the Atlantic coast, even as far south as Florida, with diminished intensity as they move forward from their remote thern source.

THE SOUTHERN COASTAL PLAIN

The Southern Coastal Plain.—The account already given of the antic Coastal Plain as far south as the Carolinas prepares the way for owing its extension westward, where it wraps around the southern palachians and turns into the Mississippi embayment. The mountains dually decrease in height, although preserving their disordered uctures in full strength, and thus disappear below the covering strata of coastal plain in northern Georgia and Alabama. With the burial of mountains, the granite and marble quarries of the older belt, and the l and iron mines of the newer belt, give way to the agricultural ustries of the plain. The plain is well dissected and hilly in the interior, h local relief of from two to four hundred feet; it gradually descends vards the coast, and there falls to broad prairies, recently emerged from waters of the Gulf, still flat and marshy. Pine forests cover much of region, yielding valuable lumber as well as resinous products. The pulation is generally rural or gathered in small villages; even the largest es are of moderate size. Middle Alabama offers the only peculiar ture that deserves special description; this is a belted arrangement of n, such as has been described for New Jersey. An inner lowland

borders the older land of the Appalachians; an upland known Chunnenugga Ridge encloses the inner lowland; and the outer slope the "ridge" descends to the flat coastal prairies. The inner lowland h been worn down on a weak, loose-textured lim stone; its flat surface is covered by a rich so and here is the chief cotton belt of the State wi the largest cities of the agricultural distri Being without good road metal, the roads a often impassable in the spring; the travell must then mount a horse and take to the field The "ridge" stands up because its strata a more resistant than those of the inner lowland being sandy for the most part, their soils a relatively infertile. The coastal prairies are lo because they have never been uplifted high; th are smooth because they cannot be dissect while standing near sea-level. *Mobile*, at the he of a bay formed by drowning the lower vall of Alabama river, the result of a slight depre sion of the region, is the chief port of the Gulf coast, east of the Mississip

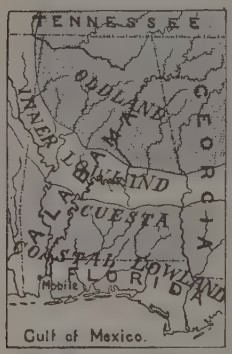

FIG. 360.—*The Alabama Coastal Plain.*

Slavery.—The Southern Coastal Plain is chiefly responsible for t grievous affliction of slavery that so long blighted the southern States a poisoned the whole country. The settlements of the whole Atlantic coa were at first to blame for the iniquity, for slaves were originally held New England as well as in Virginia and the Carolinas; but in the nor slave labour was of so little profit that sordid motives did not deceive t awakening conscience of the people; and before the system gained strong hold it was uprooted. In the south, on the other hand, slave labo on the plantations became extremely profitable; and moreover, the heat summer, it has often been asserted, was too severe for white laboure The principles of the people very naturally followed their profitab practice, and slavery became an established institution. The populati was thus divided into three chief classes, the white slaveholders, the lan owners and leaders, financially and politically, of the south, men of wealt ability, and high position; the poor whites or "white trash," in large pa the descendants of very undesirable colonists of early days, owning slaves and very little property, lazy, ignorant, and poverty-stricken, despis by both the other classes; and the negro slaves, with no property influence whatever. To these three classes a fourth may be added; t sturdier people of the uplands, inland from the coastal plain, often owni no slaves, sometimes owning a few, not profiting enough by the system slavery to be strongly attached to it, yet not sufficiently wealthy or poli cally important to exert much influence, and too generally casting wh influence they had with the more ardent slaveholders as against the peop of the north.

If the distribution of the wealthy and the influential slaveholders were rted, it would be found to be closely associated with the Southern astal Plain, and especially with the belts of richer soil. The piedmont rder of the Appalachian belt, the inland Appalachian valley (the Shenan-ah valley of Virginia and the Valley of East Tennessee), the flood plain the Mississippi and the isolated limestone basins of western Tennessee d northern Kentucky (the Blue Grass country) were also profitable slave-ding districts · but the stronghold of the system was on the coastal in. Better that the in should never have wn a pound of cotton, ter that its fertile ta should never have erged from the waters the sea, than that very and its direful, g-lasting consequences uld have come upon United States. Now r a dreadful struggle, very is abolished and ter conditions are ered in. Considerable sums of public money are devoted by the several tes to the education of the negroes, but always apart from the whites; ny schools are supported by contributions from the northern States; ne advance is made in the ownership and cultivation of land and in the ctice of trades; but political rights are practically withheld from the mer slaves; there is still a great body of poor and ignorant negroes ften a majority of the population—set apart from the whites by all the judices that divide the races of mankind. The coastal plain has much answer for, in so far as it led to this unhappy condition.

FIG. 361 —*The Old Slave States and the present Distribution of Negroes.*

Florida is an anomalous out-growth from the Southern Coastal Plain, ow up-arching of the sea floor, nowhere reaching more than a few ndred feet above sea-level. Much of its interior is underlain by lime-nes; here numerous lakes are found as if occupying cavities dissolved t of the soluble rock, and many streams disappear in "sinks," emerging ewhere in large springs. Nearer the coast the land is low and often rshy, especially in the south where the grassy Everglades form an penetrable wilderness, and where the shore line is often bordered by ngrove swamps, especially on the western side. Remnants of Indian bes are still found in this untamable country. The eastern coast is rdered by extensive sand reefs with remarkably even shore lines, closing long narrow lagoons. In Florida, as well as further north to rolina, there are strata so rich in phosphatic deposits—largely derived from e bones of sea animals—as to be valuable as fertilizers; they are already

excavated in shallow pits and exported in considerable quantity; but th industry is only in its infancy, awaiting the further exhaustion of the soils i the northern farms for its full development. The southern extremity Florida and the outlying islands are coral reefs; in part slightly elevate and worn down again; in part growing at sea-level; thus resembling th extensive banks of the Bahamas to the south-east.

The far southern reach of Florida between the Atlantic and the Gu waters gives it an almost torrid climate. It has a plentiful rainfall, with stronger maximum in summer than is found anywhere else in the Unite States. Tropical cyclones frequently pass the Florida coast in the la summer or early autumn, on their curved track between the West Indi and the North Atlantic. They sometimes cause disaster on the low coast lands by brushing the sea-water ashore in storm tides, as well as by ove whelming the unwary mariner; but their coming is generally announce by the Weather Bureau. The mild winters of Florida attract mar invalids from the more severe climates of the northern States. Th high mean temperature permits the cultivation of subtropical fruit which are sent in large quantities to the northern markets; but a co wave occasionally sweeps down from the north-west in the late wint and freezes the orange trees and early vegetables; hence fortunes hav been lost as well as made in the orchards and farms of Florida. *Key We* on an island off the south end of the peninsula, is the United States nav station for the Gulf.

The Lower Mississippi.—During the deposition of the strata the Southern Coastal Plain, a strong embayment occupied the place the lower Mississippi. As the region was elevated, many rivers, formeri independent, were engrafted on a single trunk, and thus the "father waters" was formed. The upper Mississippi deserves no higher rank tha the Ohio and the Missouri; indeed, in the matter of age, the Ohio hea waters in the Black Mountains of North Carolina and the Missouri hea waters in the Rocky Mountains of Montana, Wyoming, and Colorado, a much more venerable than the post-glacial parvenus of the upper Mi sissippi in Minnesota; but the lower Mississippi combining them all truly a great river. The early French explorers of North America entere the interior by its two chief waterways, the St. Lawrence and the Mississipp Their presence is revealed by many names still in use, such as Queb and Montreal, New Orleans and Baton Rouge, St. Louis and Louisian The defeat of the French at Quebec transferred all their possessions o the northern river to British control. The purchase of Louisiana brough a western empire into the possession of the United States. In both cas the upper basin of the river followed the fate of the mouth.

Although bearing a heavy load of silt, the great volume of the Mi sissippi enables it to establish a channel of very gentle slope. Its vigoro meanders, swinging now this way, now that, have alternately worn ba the bluffs on the east and west so that the flood plain has gained a bread

from thirty to sixty miles over a length of 600 miles. The greater part of
plain slopes gently away from the river
nks, and is therefore liable to be flooded at
es of high water. Hardly a year passes but
noderate flood occurs in one part or another;
rdly a decade without a devastating inunda-
n. Near the river the plain is partly cleared
d cultivated: its rich soil produces abundant
ps of cotton and sugar cane. Further back
on the river a great part of the plain is
t yet cleared. Southward, the flood plain
ntinues into the delta, which is rapidly build-
forward into the Gulf. The river there
ides into a number of outgoing branches or
tributaries, each of which is enclosed in its
thest advance by low and narrow banks of
d. Few deltas in the world more clearly
nibit in their digitate outline the intention of
ir river; few are more indifferent to the
sire of the waves to turn their front into a
ooth convex curve. The mouths of the dis-
butaries are known as "passes"; at one of
m, jetties have been formed to confine the
er breadth, increase its velocity, and thus
se it to scour out a deeper channel for the
vantage of navigation. No large cities have
wn upon the flood plain except *New Orleans*,
chief city of the Gulf coast, the harbour
y where internal and external commerce meet. Its population contains
ny Creoles—Americans of French ancestry—and many Italian immi-
grants. *St. Louis*, although above the mouth of the Ohio, may be regarded as standing at the head of the great flood plain. In earlier years, when river transportation was at its best development, the two cities of the lower Mississippi were intimately connected; a voyage on a Mississippi steamboat was an experience *sui generis*, in the way of boat construction and navigation, as well as in the chance of meeting with planters and gamblers, and of seeing a cargo of "slaves, cotton

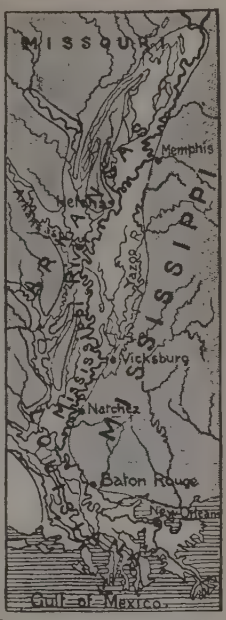

FIG. 362.—*The Mississippi Flood Plain (white).*

FIG. 363.—*The end of the Mississippi Delta.*

and other merchandise." The trip may still be made; there are still shif ing sand bars on the "crossings" between the river curves, and there is st

FIG. 364.—*The Site of New Orleans.*

a great extent of unoccupied forest alo the river banks; but here, as well further north, the rapid transportati of the railroad is largely replacing t slower movement of the river bo except for local traffic supplied by t settlements on the flood plain itse Between New Orleans and St. Lou the chief settlements are at points whe the swinging river touches the blu on one or other side of the plain. Ha pening in this century to lie nearer t eastern side of the plain than the we ern, *Memphis, Tenn., Vicksburg, Mis* and *Natchez* and *Baton Rouge, La.*, a on the eastern bluffs. *Helena, Ark.*, is the only important city on t western bluff below St. Louis. To these must be added *Cairo, Ill.*, at t junction of the Ohio and Mississippi.

If engineering skill ever suffices to control the floods of the Mississip to restrain the shifting of its meandering channel, and to drain the "bac swamps" of its flood plain, the whole surface may be cultivated. Alread some steps have been taken toward this profitable end. A Mississip River Commission has constructed elaborate maps of the river, and exte sive dikes or "levees" are constructed along its banks. Another centu may see great advance made from this beginning, and then the product the Mississippi flood plain will be proportionate to its vast extent and inexhaustible fertility.

TRANS-MISSISSIPPI STATES

The Trans-Mississippi States.—The tier of States from Minneso to Louisiana immediately west of the Mississippi presents an epitomis review of what has already been described. Northern Minnesota is extension of the Laurentian highlands, a region of ancient rocks wo down to moderate relief, rich in iron ores. It is abundantly strewn ov with sheet drift and heaped moraines enclosing innumerable lakes. northward slope, with that of eastern North Dakota, drained by the R River of the North, was the seat of the vast glacial-marginal Lake Agass stretching far north into Canada against the retreating ice, and overflowi at a dip in the height of land on the south, where the channel now follow by the Minnesota river was cut. The shore lines of the lake and t deltas of inflowing rivers on the east and west are not less distinct than t channel of its outlet, although now abandoned by the waters that ma them. As with the Laurentian glacial lakes, the shore lines of La

gassiz now rise northward at a slight inclination, proving an elevation of e land in the north during and since the disappearance of the ice sheet. he lake-floor, a vast treeless prairie, one of the most nearly level tracts on e face of the Earth, has been occu- ed by great wheat farms; the fine cture of its soil, the smoothness of surface, and its freedom from forest owth have promoted its rapid settle- ent, while the rolling drift country the east and west, with its stony oraines, its abundant forest growth, d its many lakes and swamps, is less nerally occupied. Here as elsewhere the north-west, Scandinavian immi- ants are numerous.

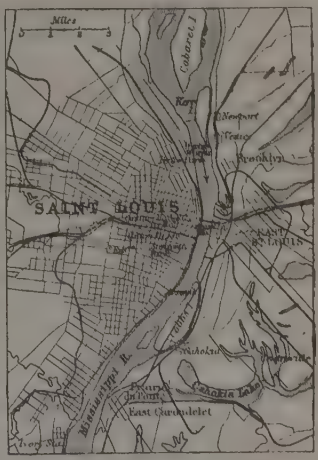

FIG. 365.—*The Site of St. Louis.*

Southern Minnesota, Iowa, and orthern Missouri—and the adjoining rts of South Dakota, Nebraska, and ansas—resemble the western prairie ates of the Ohio region. The sur- ce is underlain by nearly horizontal ata of ancient date, similar to those hich stretch southward from the isconsin highland. There is the same general concealment of rock dges, except in the banks of the post-glacial stream courses; the same ide expanse of gently undulating plains of till, the same ornamenta- on by belts of hilly moraines. Most of the surface is treeless prairie, ry fertile and widely cultivated. Many villages and small cities have rung up, but there are as yet no large cities. Railroads are almost as entiful as east of the Mississippi. There is no part of the United States which the succession of earlier and later drift sheets is so well displayed. the northern part of this district the forms produced by the ice are rdly modified, except close to the sharp-cut stream lines; the till plains e still undissected, lakes are still present in the moraines: here the drift is ry young. In the southern part there are no lakes and the surface of the ift is well carved by numerous branching streams into an undulating sur- ce: here the drift is comparatively old. The interval between the earliest d latest ice advances must have been much longer than between the latest lvance and the present day. The fertile loess mantle that so generally oaks the more southern drift is distinctly associated with one of the rlier advances; the latest advance produced no loess, but gave forth ergetic rivers that bore streams of gravel along the valleys far beyond e terminal moraines.

Tornadoes of the Mississippi Basin.—The plains immediately the west of the Mississippi vie with those immediately to the east of the

river in affording opportunity for the development of tornadoes during th spring and summer months. These violent and destructive whirlwind are now shown to be almost limited to the south-eastern quadrant of larg cyclonic or low pressure areas, in that part of the cyclonic track and i that season which provides strong contrasts of temperature and humidit in the inflowing winds. The same great cyclonic storm, a thousand mile in diameter, may be followed in its eastern progress all across Nort America, and far out upon the North Atlantic even to north-weste Europe. The general circulation of its whirling indrafts is alike durin its entire journey of five or ten thousand miles; but only on passin the middle Mississippi basin in spring or summer are tornadoes frequentl developed. They occur within thunderstorms, but by no means withi every such local storm; hence it may be inferred that their developmen depends on highly specialised conditions, such as warm and moist souther winds in the lower atmosphere, and a probable overflow of cool and dr westerly winds aloft. The destructive tornado whirl, within which hang a writhing funnel-shaped cloud, is seldom over a thousand yards i diameter. It travels rapidly, usually from south-west to north-east, aver ging thirty miles an hour, while the velocity of the winds themselves mu exceed a hundred miles per hour. The storm comes out of the cloud west with little warning, lays waste its narrow path with a frightful roarin and quickly disappears across the prairie. Trees and buildings ar violently destroyed in a moment, if the full force of the whirl comes upo them. Little wonder that those who have witnessed but escaped a tornado fury are nervously apprehensive when dark clouds gather over the weste horizon in sultry summer weather.

The Missouri Highlands.—The Missouri river roughly follow the border of the drift area on the west of the Mississippi, as the Ohi does on the east. There is some reason for thinking that the course the river was determined when an early ice sheet lay on the country to th north-east of it, thus increasing its resemblance to the Ohio. It is now a we established river, with a flood plain generally several miles wide, incised o or two hundred feet below the uplands on either side. Many towns, li Jefferson City, the capital of Missouri, occupy the bordering uplands whe the swinging river impinges against the base of the bluff; thus showi that here, as on the Ohio, river travel was important before the days of t railroad. Now many steamboats are rotting at their wharves.

South of the Missouri, the land rises gradually to the Ozark Plateau (V in Fig. 353), a broad flat dome of Palæozoic strata, in general less dissect but singularly like the Allegheny plateau in many respects. The uplan include a number of ragged *cuestas*, that is, reliefs determined by th harder members of the plateau strata whose gently inclined position caus them to form escarpments of irregular front, two or three hundred feet height on the outcrop side, but descending slowly to lower ground in th direction of their dip; the belt of lower ground between the back slop

ie cuesta and the escarpment of the next being the surface expression of e weaker strata that lie between the cuesta-makers. The chief river lleys are cut down beneath the level of the belts of lower ground, and e therefore doubly deep in their passage through the uplands of the iestas. They are generally steep sided and narrow floored: some of em have singularly meandering courses, like that of the Osage. The opulation is gathered on the broader interstream uplands, and is almost xclusively engaged in agriculture. The chief exception to this statement found in the St. François Mountains, eastward from the higher parts of ie plateau, where iron mining flourishes; this being the natural result of .e emergence here of several ancient mountain summits that rise through ie stratified rocks of the plateau from a buried Archæan land surface. ron Mountain is one of these summits; Pilot Knob, a landmark seen om afar, is another. The plateau slowly decreases in height and increases ruggedness on approaching its border in northern Arkansas. Across its hole breadth, there is an increase in the abundance of natural tree rowth, in contrast to the treeless prairies of Iowa; the rugged southern art of the Ozark Plateau is abundantly forested and thinly inhabited.

The Arkansas Highlands.—The lower country of central Aransas, next beyond the southern border of the Ozark Plateau, is deterined by the upturning of the strata, which from the beginning of their verlap on the Archæan floor of northern Minnesota had been almost orizontal. The denuded folds of the crushed rocks form the Ouachita Iountains, occupying a belt that trends east and west across middle Aransas, disappearing under the embayment of the Southern Coastal Plain o the eastward, and extending far into the dry country to the westward Ou in Fig. 353). Here so many repetitions of the Appalachian structure nd form have been found that the Appalachian mountain-making disturbnce of Permian time is now recognised as extending far beyond the limits riginally assigned to it in Alabama. The harder strata stand up as ridges f moderate height, turning in angular zigzags of true Appalachian habit; he streams cut through the ridges in sharp water gaps; the farming ountry lies in the basins and "coves" divided by the ridges. Certain andstone layers in the ridges are of extremely fine texture and are extenively quarried for whetstones.

The uneducated population of the South is at its worst in the "piney voods" of central Arkansas. Whether because of inferior ancestry or ecause of the blight of slavery, the people of the country districts, white s well as black, are here miserably degraded. As so often elsewhere in ie South, the shiftless farmers often buy seed for spring planting with ioney borrowed on the prospect of the autumn's harvest. They show ttle desire to improve their condition, and remain ignorant, badly housed, oughly clothed, and poorly fed from generation to generation. Some of ie inertness of the people may be charged to the extreme heat of the immers; but from whatever cause, their slow progress makes a sad

contrast to the rapid emergence from frontier conditions in such States Wisconsin and Iowa. Amid rural surroundings so deplorable, it is natu that the urban population should grow slowly, and that manufacturing a mercantile activity should be at the lowest ebb. *Helena* on the Mississi and *Little Rock* on the Arkansas, the chief cities of the district, are only local importance.

The Red River Rafts.—Southern Arkansas is overlapped by coastal plain which continues through Louisiana to the shore of the G of Mexico, repeating many of the conditions already described for region east of the Mississippi. Much of the surface is still forest and the population is almost entirely rural and agricultural. The flo plain of the Red River deserves mention among the physical features account of the famous "rafts" by which the river channel through it been encumbered for distances of twenty or more miles. The rafts formed by the accumulation of tree trunks that have been swept in ti of flood from the forested flood plain further up the valley. The old trunks rot away at the lower end of the raft, while new ones gather at upper end; thus the raft slowly moves up stream. In recent years navigable channel has been opened through the raft above *Shreveport* and kept clear by patrolling "snag-boats." Appropriate to the slow p gress of the region, river transportation has not been so generally supe ceded by the railroads here as in the north. Partly on account of t obstruction of the river current by the raft, partly on account of the lar amount of sediment brought down from the upper waters in the *Llan Estacado* of Texas, the flood plain of the Red River is rapidly aggradi or building up the valley floor. The side streams in Louisiana, unable aggrade their valleys at the same rapid rate, expand on approaching t main valley, and thus form a number of lakes of unusual origin. T coastal prairie offers little temptation to settlement. Its surface is so lo flat, and marshy as generally to be unfit for cultivation; its shore possess no good harbours, and is subject to storm floods from the sea.

The Coastal Plain of Texas.—The Southern Coastal Plain exten south-westward into Texas. Its shore line sweeps in a long concave cur from the fingered delta of the Mississippi to the rounded delta of the R Grande. For nearly all this distance the low margin of the plain bordered by off-shore sand-reefs, built by wave action in the shallow wat of the Gulf. The reefs are of extraordinary continuity, by reason of t weakness of the tides. Padre Island, the reef that extends northward fr the Rio Grande delta, measures nearly a hundred miles without a bre and in this respect is strikingly unlike the broken reefs and sea islands South Carolina, where the much stronger tides maintain many openi leading from the mainland to the sea. Texas is so poorly provided wi harbours that its chief port, *Galveston*, is situated on one of the off-sh sand reefs, where it was devastated by a hurricane and simultaneous s flood in 1900. The other ports are on shallow bays (valleys in th

oastal plain, slightly drowned), accessible only to vessels of moderate raught through narrow inlets of the sand-reef.

The coastal prairie is treeless except along the watercourses; it forms a ast grazing country. Further inland, the surface rises slowly, is dissected nto a hilly expression, and is more generally wooded. Then follows the lack prairie of smoother surface and more fertile soil, a great cotton district, ke that enclosed by the Chunnenugga Ridge of Alabama. Here are the nief interior cities, including *Austin*, the capital. Finally, the long slope f the Grand Prairie, a Cretaceous cuesta of large dimensions, ascends to plands of considerable altitude before descending by a ragged escarp-ient to the "central denuded region," a farming district of ancient rocks nd diversified structure, form, and resources. The Cretaceous cuesta is aversed by valleys that lead rivers outward from the interior denuded egion; but between the valleys its upland surface is relatively continuous, great uniform expanse. Here already the rainfall is becoming deficient, oreshadowing the aridity of western Texas. The "Northers" of the exas coast are winds that sweep down from the Great Plains, when a yclonic area lies on the Gulf: in winter they are cold waves.

THE GREAT PLAINS

The Great Plains.—A vast sub-arid region, extending from the ans-Mississippi tier of States to the base of the Rocky Mountains, is nown as the Great Plains. The eastern boundary of this division is ndefinite; the dry plains merge into the more fertile prairies in the astern part of the second tier of States west of the Mississippi. The lains are more varied in form than the name implies, and are indeed hilly nough over large districts to be called rugged. Even where most nearly evel, they generally roll in broad swells, whose variation of height is equently to be measured in scores of feet. Moreover, most of the rivers f the plains have incised their valleys to depths of fifties or hundreds of eet below the interstream surfaces; and the branch streams, gnawing eadwards, produce a broken country on either side of the main valleys nat is anything but plain. A dry climate excludes growth of trees, xcept along the streams, or on the higher hills and escarpments; and the ame of the region is more an expression of the almost boundless view isclosed from every eminence than an indication of its precise form.

The dryness of the plains predestines them to a small population. To-ay, with the advantages of many railroads, the traveller is impressed with ne great amount of unoccupied space. Yet from this vast region, once eemed almost a desert, cattle are now shipped in great numbers to the nore eastern cities, although they require a much greater grazing area than n the prairies. The Côteau of the Missouri in North and South Dakota, here the Great Plains enter the United States from Canada, is a broad pland, that descends with some approach to abruptness on its eastern side

into the lower ground drained by James River: it is the topographica expression of a series of Cretaceous strata which extend far west and soutl under the plains, and which here crop out to the eastward; it may b taken as marking the transition from the moister climate and more plen tiful grass covering of the prairies further east, and the dryer climate an scanty grass covering further west. The upland is belted over with man moraines of rolling, hummocky, boulder-strewn surface, not high enoug to be formidable, but uneven enough to be fatiguing to the drove teamster, or horseman, and too stony to yield easily to the plough. In th absence of landmarks, one may easily be lost among the morainic hill and hollows. The abandoned channels of large glacial rivers are charac teristic features of the drift-covered uplands; one may sometimes ascen the gentle grade of their broad floor between well-marked banks, and a last emerge on the top of a morainic belt, with a broad stretch of lowe ground beyond; here the channel heads against the air, and here th source of its extinct river in the edge of the ice sheet must be inferred The blizzard finds its best development on the broad Côteau. It is violent cold-wave wind, at a temperature near zero F. or lower, driftin clouds of fine snow by which all landmarks are hidden. A guide of rop is needed in going a few hundred feet from a house to a barn in one o these freezing, blinding storms. Travellers on foot should be rope together, as if climbing Alpine peaks.

Beyond the Missouri to the Rocky Mountains in Montana, there is great space of comparatively even plains, interrupted only by occasiona eminences and by the sharply incised valleys of the larger rivers and thei short branches. The eminences are of various types. The Little Rock Mountains, near the Canadian boundary, are local upheavals of the under lying strata in a dome-like structure, now much denuded. The Bear Paw Mountains, also far north, are a group of peaks formed by the dissection o an ancient volcano. The Highwood and the Crazy Mountains, betwee the Missouri and Yellowstone rivers, owe their altitude to the network o igneous dykes and stocks which have locally indurated the enclosin strata. Various ridges, buttes, and mesas are the consequence of th better resistance to erosion of dykes and lava sheets, than of the wea strata of the plains. Taken altogether, these embossed forms prove th the surrounding plain is not smooth because it retains the form of the s floor in which its strata were laid down (like the coastal prairies of Texa but because it has been well worn down from whatever initial upp surface it once possessed. It is a true plain of denudation, with the re nant hills and mountains here and there to serve, like once overwhelm nilometers, as minimum measures of the height to which the ent surface once rose. As a plain of denudation, the region must have be worn down so low that the rivers wandered idly upon its surface. T sharply intrenched valleys of to-day prove that the denuded plains ha been broadly uplifted, with an inclination eastward, and this only le

ough ago to allow vigorous rivers to erode narrow valleys. There are w better examples of composite topography than this.

Hills of the Great Plains.—The hills and mountains that rise over e plains bear trees on their upper slopes. The plains are absolutely eeless, but offer good grazing ranges, and are now stocked with andering herds of cattle. Although the winters are cold, the snowfall is ry light; the cattle are left unsheltered on the open ranges all the year und, to get along as well as they can; they generally endure their winter ivations, but severe losses occur during blizzards. Sheep cannot survive ithout protection and food. There is a tendency among the ranchmen to rry the name of "Prairie" far west to the thinly grassed upland plains, t thus used, the word is a deceptive misnomer. The uplands are out of ach of irrigation, but the valley floors, half a mile or more in width, are ten watered by canals from the rivers: here cultivated fields produce od harvests. All the settlements are on the rivers: *Bismarck*, where the orthern Pacific railroad crosses the Missouri, *Fort Benton*, an early ilitary station at the head of navigation of the Missouri, and *Great Falls*, here the revived river has developed a number of cataracts on a series of sistant sandstone layers, are examples; the latter uses its water power in rious industrial works, as well as in driving street cars and in furnishing ectric light. The homes of the cattlemen are likewise in the valleys, out sight of one another and widely separated by the unoccupied plains. mportant Indian reservations lie near the mountains, where the Red Man ill remains in large numbers. The denuded plains extend along the ocky Mountain border far south into Colorado, repeating the features ove described except that the residual hills are comparatively rare. ere the upland surface is often strewn over with sheets of river-washed avels, derived from the mountains, and of practical importance as water-earing deposits. As in Montana, the rivers are now intrenched in valleys eneath the upland surface.

The Black Hills, in South Dakota and Wyoming, occupy an oval pheaved area, measuring about a hundred miles in its longer north nd south diameter (BH in Fig 353). It is a dome-like mountain uplift n a scale intermediate between that of the Little Rocky Mountains of stern Montana and of various members of the Rocky Mountains proper. lthough the covering strata of the dome-like uplift have been greatly enuded, the hills surmount the plains by one or two thousand feet, and thus duce a local increase of rainfall. The Black Hills are, therefore, well rested, and their dark appearance, when seen in the distance, has given em their name. They supply much lumber to the ranches on the sur-ounding plains. The denudation of the originally arching strata has worn em back to concentric rimming ridges, and has revealed their foundation cks of very ancient origin: and as these bear gold and silver, mining has me to be an important industry in the hills. Two railways have pushed eir lines from the prairie States across the eastern plains to the Black

Hills, and now compete for freights from the mines as well as from th cattle ranges on the way. Here, as so often elsewhere, strong butte mark the site of heavy "necks" of volcanic rocks and testify to the grea and general denudation that the hills and plains have suffered. Mat Teepee, north-west of the hills, is the most remarkable of these forms, great bare rock-shaft of columnar structure, six hundred feet in height without a rival in the world.

The Bad Lands—the *mauvaises terres pour traverser* of the earl French *voyageurs*—are named from their excessively rough and barre surface, the result of minute and detailed dissection by wet-weathe streams. They are found in many parts of the western arid country nowhere in better or greater development than along the branches of th Missouri north and south of the Black Hills. The fine-textured strat thus carved are in many cases of lacustrine or fluviatile origin and o Tertiary age; the result of accumulation in broad basins formed by sligh warpings of the Great Plains. A wonderful series of mammalian fossil has been entombed in them. The dry climate of the plains allows only scanty covering of vegetation; the fine texture and imperfect consolidatio of the lacustrine strata promotes their denudation. Similar strata in moister climate would be so well covered by vegetation that little wor would be done by small streams and rills; most of the waste would wash evenly from the slopes to the larger valleys, or would creep slowly dow hill in soil-cap motion, and the forms of the surface would be smoothly rounded. It is curious to note that in such cases, the vegetation sup ported under the greater rainfall largely counteracts the work that th rainfall would do alone; it is in dry regions that the direct work of smal streams is best displayed, even though their action is intermittent.

The Sand Hills.—North of the Platte River a large extent of th Great Plains in Nebraska is occupied by low sand hills, or dunes, heaped b the wind from incoherent sandy strata. There is a scanty growth of gras in the hollows between the hills, and here, as well as elsewhere on th plains, great herds of buffalo wandered in the first half of the nineteenth century. But explorers and emigrants looked on the region as a desert for it gave them little support during the slow progress of their waggon or "prairie schooners" across its monotonous waste. Yet to-day a railroa traverses this "desert" on its way to the Black Hills, and carries man cattle from ranches among the sand hills to eastern markets.

The loose texture of the strata of the plains exert an influence on th behaviour of its rivers as well as on the form of its bad lands and its san hills. The rivers are so abundantly supplied with the waste of the lan that they need a relatively strong slope on which to gain a velocity th will enable them to wash along their load. Hence, in spite of the co siderable altitude of the plains—3,000 or 4,000 feet over vast areas—th valleys are of moderate depth, and the local relief is, therefore, less than would be if the strata were more thoroughly indurated, and the valle

more deeply cut. The Platte illustrates this principle in a striking manner, for its broad channel is little sunk below the adjoining plains. Its visible volume decreases by sinking underground from a good supply near the mountains to a comparatively slender stream wandering on a broad bed of sands in the sand-hill region. Only in occasional floods is the channel filled from bank to bank.

The Plains of Kansas ascend westward in a series of broad benches that are separated by east-facing bluffs of moderate height and ragged outline. These are similar to the belted uplands or cuestas of southern Missouri: each bench is underlain by a relatively resistant stratum, whose outcrop forms its limiting escarpment. The flood-plained valleys of the larger streams have little relation to the cuestas, but traverses them irregularly. While the eastern part of this region generally has a sufficient rainfall, the western part of Kansas reaches an arid region whose settlement has been attended by much misfortune. The practice of borrowing money with which to stock a new farm was here organised by loan companies; and it happened that between 1880 and 1890, when this business was at its height, the rainfall on the Great Plains was heavier than usual, and for a time all went well. Many enthusiasts believed that the climate had been favourably changed by the cultivation of the ground. Then in one of the times of decreasing rainfall, common to all semi-arid regions, crops failed, the disappointed settlers left their farms, and the eastern investor found himself the owner of a distant patch of worthless ground on the boundless plains. The legitimate use of borrowed capital in eastern Kansas and Nebraska, as well as on the prairies, has been beneficial both to borrowers and lenders in many cases where the farms were favourably situated, but the plains are still desolate; little settlements here and there in the valleys only emphasise the emptiness of the uplands.

Omaha, in Nebraska, and *Kansas City*, on the border of Missouri and Kansas, both on the Missouri river, are the chief cities of the western prairies, near the eastern borders of the plains. They have grown rapidly during the latter decades of the century, with the extension of railroads across the plains and the growth of cattle ranching. They are rivals as railroad centres and as cattle markets.

The Llano Estacado.—The Ouachita mountain range of middle Arkansas extends westward into Indian Territory and Oklahoma, interrupting the plains for several hundred miles, but disappearing beneath them before reaching the Rocky Mountains. This region is not yet well studied owing to its having been long set apart as a home for various tribes of Indians when they were removed from their original homes. It is followed on the south-west by the *Llano Estacado*, an even-topped plateau in northern Texas, confluent with the Great Plains in the north-west, gnawed on the north-east, east, and south by the head waters of many rivers that flow to the Mississippi and the Gulf, and divided from the mountains on the west by the valley of Pecos river. As a source of

sediment for fertile flood plains in a moister climate near the coast, th Llano is well placed; but its upland surface is too arid for profitab occupation, unless by wandering herds, and for these the scarcity of wat is a formidable difficulty. In summer the plateau is intensely hot by da and it is probably from this region and its fellows beyond the Mexica boundary that the "hot-winds" of Kansas and Nebraska are derive These south-west winds are veritable scourges, for with a temperature 95° or more and an extremely low humidity, they blight the fields ov which they pass. They frequently affect narrow belts in the direction their progress, as if their excessive heat was limited to a small current the general movement of the winds. Fortunately they are of ra occurrence in their greater severity. It has been suggested that, lik similar winds observed in northern India, the high temperature of the fiery blasts is immediately derived from compression during their desce from a considerable altitude; but it is manifest that they must have bee previously heated when near the ground.

Denver is the only important city on the Great Plains. Thirty years ag it was reached only by stage-coach; now it is the focus of many railroad some coming from the Mississippi valley, others entering the Rock Mountains which rise a dozen miles away. There was originally nothin in the immediate surroundings of Denver to give it eminence over a sco of other frontier settlements. It is built on Cherry Creek, which, lik many another stream in the dry country, is a bed of sand and gravel durin much of the year, but which occasionally rises in furious floods fro cloud-burst rains. The neighbouring plains for a hundred miles a occupied partly as cattle ranges, partly as irrigated farms. The mountain beyond have mining towns here and there. The successful growth Denver depends partly on the long distance by which the Rocky Mountain are separated from the cities of the Mississippi valley, partly on th contrast between the Plains and the Mountains; for even in the days o railroads, centres of trade must not be too far from their constituents.

THE ROCKY MOUNTAINS

The Rocky Mountains.—The Great Plains are terminated abrupt on the west by the front range of the Rocky Mountains, which rises from base of 4,000 or 6,000 feet to summits of 10,000 or 14,000 feet. Many oth ranges of similar height follow further west; each has its local name, the Teton Range in Wyoming, south of the Yellowstone Park, one of th grandest mountain groups in the west; the Sawatch Range beyond t upper waters of the Arkansas in Colorado, with its chief peaks, Harvar Yale, and Princeton, named after eastern colleges; the Uinta Range Utah, exceptional in having an east and west trend nearly at right angl to its fellows; the Wahsatch Range in Utah, overlooking the arid ba of Great Salt Lake on the west. Although often of bold and vigoro

orm, "needles" and "horns" are comparatively rare. Talus-covered lanks of uniform slope are extensively developed. The upper slopes tand high above the tree line, yet they gather only small snowfields and bear no glaciers except in northern Montana. The moraines of extinct glaciers are, however, abundant in many valleys. The middle and lower slopes are generally forested, except in the far south.

Geology of the Rocky Mountains.—The geological series in he mountain ranges extends from the ancient crystalline rocks through he Palæozoic and the Mesozoic to the early Tertiaries. Well-defined Devonian horizons usually have small thickness. The Carboniferous is a heavy marine limestone with no trace of coal. Workable beds of coal, chiefly lignite, occur in the upper Cretaceous and lower Tertiary. The long maintained conformability of the rock series, sometimes without a break from Cambrian to Cretaceous, gives an interesting contradiction to the early doctrine that a great break is always to be found between the Palæozoic and Mesozoic. The prevailing absence of metamorphosed sediments is a notable peculiarity. Igneous rocks are common in the form of intrusive sills and laccoliths, and in the Yellowstone region there are extrusive flows and agglomerates of great thickness and extent.

The structure of many ranges is anticlinal. The axis of the front range, south of the Missouri, is largely composed of granite, from which the bedded formations dip away with much regularity on either flank. The Uinta Range is still arched over by Carboniferous strata for much of its length. The Wahsatch is peculiar in being of synclinal structure, with an east to west axis at right angles to the range, and broken across by a great fracture that marks the eastern border of the Great Basin and exposes a vast natural section on the western slope of the mountains. North of the Missouri river, and extending into Canada, the front range also assumes a synclinal structure, with a great overthrust fault near its eastern base: here the lower Palæozoic formations are extremely heavy, while further south, where the anticlinal structure prevails, they are comparatively thin. Massive laccoliths form the resistant centres of some mountain groups in western Colorado; they are greatly denuded and elaborately carved, forming some of the most picturesque scenery of the region.

On passing from the modern, undisturbed strata of the Great Plains to the ancient, disordered structures of the Rocky Mountains, the pastoral industries of the one region give place to the mining industries of the other. Important deposits of gold, silver and copper have been profitably worked at *Cripple Creek*, *Leadville* and *Butte*; hundreds of less valuable deposits have led to moderate returns or to unknown losses; countless "prospects" have been tested by pick and shovel in all parts of the mountains, high and low. Modern methods of drilling rocks and treating ore are so rapid that already many mining districts are nearly or quite worked out; their excitable population, with the feverish accompaniments of saloons and gambling houses, have moved away to some

newer "camp." In spite of the scant half century of exploitation, deserte villages are no rarities.

Intermont Basins.—Many basins are found among the mountair where broad surfaces of moderate relief attract the ranchman to rai cattle and wheat. Here railroads make their way between the ranges, ar permanent settlements spring up. To this steadier class of population, well as to the speculative and excitable miner, the future welfare of th region will be due. The basins are in all cases due to a deformation warping of the mountain structure; they serve as gathering grounds f the rock-waste swept down from many centripetal valleys: deposits gravel and sand a thousand feet or more thick having been formed in th way. The outflowing river of each basin escapes through the enclosi range in a gorge or canyon, usually so narrow and steep-sided as to useless for roads, and passable only with great difficulty by railroads. many cases the river has worn its canyon so deep that the floor of th basin is now dissected into bench land and flood plain: the latter irrigable and serves for wheat land, the former is dry and serves only f pasture. In some cases the strata of the older basins, tilted by lat disturbances and now more or less denuded, form low ridges lateral the ranges that once supplied their sediments.

The intermont basins present at first sight every appearance of havi been formerly occupied by lakes. In some cases the appearance is co firmed by the occurrence of fine silts appropriate to lacustrine conditio of deposition; but it often happens that layers of coarse texture ar irregular stratification form a large part of the basin deposits, and hence must be concluded that in such cases the warping of the basin did n proceed much faster than the filling of its floor and the cutting of i outlet, and that the deposits are fluviatile and not lacustrine. This co clusion is particularly fitting for those basins in which the floor is n level, but inclines from the margins to the river of discharge, after th fashion of piedmont slopes of mountain waste, the world over. Even lakes were formed at brief times of more rapid warping, their depth w probably small and their duration short.

The San Luis Valley, an oval depression about sixty miles lo between two ranges in southern Colorado and northern New Mexi is a good example of an intermont basin. The surface round the marg has a gentle slope towards the centre, and here the deposits are sto and gravelly; here the streams run out from the mountains in go volume. The central area is "as flat as a billiard table"; here th materials are sands and silts, and here the smaller streams wither aw in the dry air. The stronger streams unite to form the Rio Grande, wh makes its exit southward by a dark gorge through the mountains. He as in New Mexico generally, there are many traces of Mexican occupat in names and people. The Big Horn Basin, enclosed by a range an drained by a river of the same name in Wyoming, once resembled

an Luis Valley in having a smooth floor, but now it is dissected to a depth two or three hundred feet by the centripetal and the exit streams. The reen River Basin, in western Wyoming, drained by the Green river in a eep canyon through the Uinta Range, is now dissected so as to convert s once even floor into a labyrinth of bad lands, with local reliefs up a thousand feet. The "Parks" that occur west of the front range in olorado are intermont basins of greater height than usual—6,000 or 7,000 et—with rainfall enough to support here and there a park-like growth of ne trees.

The Yellowstone Park.—An extensive intermont basin in north-estern Wyoming has a plateau-like surface, built up by heavy lava beds; e numerous geysers which occur in it have led to the reservation of the gion as the Yellowstone National Park. There are picturesque mountains rdering the basin; a few dissected volcanoes, like Mount Washburn, rmount the lava beds; but as a whole the scenery is relatively mono-nous. The broad plateau is clothed with a pine forest through which e stage roads wind from one group of geysers to another. The geysers e associated with hot springs, around which siliceous deposits of grea' auty have been formed. Yellowstone lake and Yellowstone canyon are ateful variations from the sameness of the forested lava plateau. This ark," which is nearly as large as Yorkshire, will always be preserved in state of nature and serve as a refuge for native animals.

The Colorado Plateaux.—South of the Uinta Range in Utah, New exico, and Arizona, there is an extensive region of great altitude (over 00 feet) that is traversed by the Colorado river and its few branches in ep canyons. A heavy series of Palæozoic and Mesozoic strata, lying arly horizontal, has been greatly denuded, so that the stronger yers now form great platforms ending in rugged cliffs and escarpments, hile the weaker layers are worn back until they are hidden under the lus of the cliffs. In the north-western part of this area, great fractures vide the country into blocks, ten or twenty miles wide; and the adjacent ocks are moved unevenly, so that the edges of the higher blocks, now ore or less battered by the weather, form cliffs one or two thousand feet gh. Volcanic action has been plentiful. The deep-seated intrusions of stern-like form, known as laccoliths, were first recognised in the Henry lountains, a group of rugged forms in a greatly denuded region west of ne Colorado river. Lofty volcanic cones, like San Francisco mountain, id extensive lava flows are scattered about near the Colorado canyon; me of the former are more or less dissected by radial valleys, others are mmetrical cinder cones hardly affected by erosion; some of the latter rm mesas surmounting a more denuded surface, others are of modern te, still black and unweathered, occasionally forming stony cascades over ne fault cliffs. This volcanic centre constitutes a striking exception to ne rule that volcanic action is limited to continental margins and to the cean floors. It is owing to a comparatively recent uplift of this denuded

region, after the cliffed platforms had been carved, that the larger riv
have incised their extraordinary canyons, 3,000 to 5,000 feet in depth

The highest plateaux receive sufficient rainfall to be forested; the l
lofty uplands are barren deserts, unattractive to the ranchman or
miner, however wonderful to the geographer and geologist. Where
plateaux have been most vigorously dissected into a labyrinth of branch
spurs, a few tribes of warlike Indians still remain unsubdued. Wh
isolated mesas offer natural protection, several tribes of gentler nat
have made their homes. Shallow caves under overhanging cliffs cont
the abandoned stone dwellings of a people who probably chose th
singular sites for the safety that they gave from attack. A few settlers
found in valleys or basins where water can be had to irrigate their fie
Some lumbermen have attacked the forests on certain of the volcanoes n
a railroad line that crosses the desolate plateaux. Government survey
have traversed and studied the region, and it would almost seem that
greatest gain to be derived from this almost uninhabitable country v
be its teachings as to the origin of land-forms by wholesale denudation.

The Columbia Plateaux.—A great extent of country drained by
Columbia and Snake rivers in Idaho, Oregon, and Washington, is built
of vast lava sheets, which have converted a broad depression between
Rocky and the Cascade Mountains into an extensive plateau. The sh
line of the lava flood may often be traced, entering the mountain vall
in level embayments, indented by the mountain spurs which advance i
it like promontories. Isolated hills and mountains occasionally rise abo
the lava plain like outlying islands. The lava floods must have taken pl
at different dates; for while some are smooth, unweathered, and barr
as if very recent, others are more or less upheaved and dislocated, a
dissected even by small streams. The Blue Mountains in south-east
Washington are only an uplifted and deeply dissected part of the l
plateau; here the canyon of Snake River has a depth of 4,000 feet w
intricately carved walls. At certain points the stream has laid bare some
the underlying mountains; one of these, composed of resistant quartz
is cut down 2,500 feet by the river, although capped by 1,500 feet
bedded lavas. Elsewhere the dissection is of gentler nature; from ev
interstream swell of the surface a vast expanse of treeless undulati
stretches away to a horizon almost as level as that of the sea. Gray s
brush is found everywhere; scattered tufts of grass suffice for rang
horses and cattle. Near the Rocky Mountains, where the rainfall is so
what greater than over the centre of the plateau, there is a plentiful soi
the uplands, partly supplied by local weathering, partly wind-borne f
further west; here is one of the newer wheat districts of the great inte
country. Although the land is not at first sight inviting to the farme
repays his labour abundantly without the need of irrigation. *Spok*
where two transcontinental railway lines come together, is the growi
metropolis of this region.

One of the most remarkable features of the lava plateau is the former
ith of the Columbia river, known as the "Grand Coulée," carved when
s northern détour was obstructed by ice streams that descended from the
ountains on the north and west in the glacial period. Although now
early dry, the Grand Coulée may be traced for over a hundred miles across
e plateau; here narrow and deep-cut in the uplifted lava beds, there
oader and shallower in a lower upland; generally with an even floor,
t at one place broken by the cliffs of a former cataract that must have
eatly exceeded Niagara in height, breadth and variety of form. The
ols that were excavated by the plunge of the extinct cataract contain
ear blue lakes, but the cliffs are dry and bare.

The Basin Ranges.—West of the Wahsatch Range and the Colorado
ateaux, south of the Columbia plateaux, and east and south of the Sierra
evada, there is an arid region embracing all of Nevada, part of Utah and
rizona and the south-eastern corner of California, and extending into
exico. Only one important river, the Colorado, reaches the sea from
is desert empire. Nearly all the scanty rainfall dries away in the
ssicating atmosphere. The region is diversified by many independent
ountain ranges of north and south trend and of varied structure. Some
ar trees on their upper slopes; others are barren to their crests. In the
rth-west, adjoining the lava plains of Oregon, some of the ridges are
table for the very recent date of their uplift, their form being as yet
rdly modified by erosion from the original shape of their tilted blocks.
the middle of the region the ridges are elaborately carved by valleys
d branch valleys. In the south-west some of the ridges appear to be
arly worn away, only low residual knobs remaining.

The confluent depressions between the isolated ranges are floored with
ng piedmont slopes of stony and gravelly waste that has been washed
m the mountain valleys. Two approaching slopes unite in forming an
termont trough whose floor may stand at altitudes of 4,000 or 6,000 feet
Utah and northern Nevada, thus rivalling the height of many plateaux;
t it differs from a typical plateau in the prevailing absence of valleys,
r the waste slopes are built up by the streams that issue heavily charged
th detritus from the mountain gorges. Thus the depressions are filling
while the mountains are wearing down. In the south-west the floor of
e depressions is of moderate altitude; indeed, in south-eastern California
e arid floor of the Coahuila desert descends 300 feet beneath sea-level.
is depression represents the head of the Gulf of California, now isolated
the delta of the Colorado and evaporated to dryness. An outflowing
anch or distributary of the Colorado occasionally turns northwards on
e delta at times of high water, and flows into the desert basin, forming a
ort-lived lake. In south-western Arizona some of the gently inclined
edmont slopes are rock-floored, bearing only a thin veneer of waste here
d there; the streams, issuing from the mountains after a shower, find no
annels, but spread out in a sheet a mile or more broad and one or

two feet deep, washing the gravel veneers forward down the incli rock floor; this peculiar style of drainage has been termed a "sh flood."

Nearly all the streams from the mountains wither away on the dre piedmont waste slopes. Sage brush is the prevailing vegetation; sp yuccas and thorny cactus occur in the arid and warm south-west. larger streams unite to form shallow salt lakes in the lowest part of intermont troughs. Others form shallow water sheets, a few inches de in the wet season, where smooth plains of barren sun-baked mud, "playas," remain in the dry months. There are few parts of the cour less inviting to settlement than the region of the Basin Ranges, yet h as on the Colorado plateaux, the scientific explorer has reaped a r harvest. Comparable with the record of a past glacial climate in region of the Laurentian lakes is the record of a past humid climate in arid basins of Utah and Nevada. The basin of Great Salt Lake in U and that of several indep dent lakes in north-west Nevada each formerly h large lakes that rose near thousand feet on the adjoin mountain flanks, and th marked their shore lines cliffs, bars and deltas. records have been deciphe and are elaborately descri in monographs of the Uni States Geological Survey. other ancient lake basins h been so well studied.

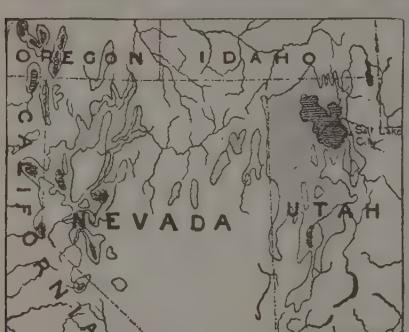

FIG. 366.—*The Ancient Beds of Lake Bonneville (in Utah) and Lake Lahontan (in Nevada). The Map measures* 550 *by* 420 *miles.*

People and Towns the Basin Ranges.— settlements of the Basin Range region may be grouped under three clas the Mormons originally about Salt Lake in Utah, the mining towns in mountains, and scattered ranches of Mormons and Gentiles, where stre can be used for irrigation. The Mormons exhibit in their polygan and superstitious creed an example of religious atavism. Their conv have been gathered from the eastern United States and from wes Europe. Their history includes many deeds of violence and cruelty much may be said in their favour. Their settlements in Utah were e lished half a century ago without the intemperance of every kind tha characterised the frontier towns of those who would in a census be cla as "Christians." Their desert home has been transformed into a produ farming country by persevering industry and thrift. Polygamy, now mally abandoned, was never practised by more than 4 per cent. of the riageable men; the Mormons should be classed as merely one more o

any superstitious sects of the so-called civilised nations. *Salt Lake City*, the shore of the lake is the centre of Mormon activity.

The most famous mining town of the Basin Ranges is *Virginia City* in rth-western Nevada. Many millions of gold and silver have been taken m the Comstock Lode, above which the city was built, and many other illions have been spent in efforts to prolong the life of the mines there ened. The discovery of the lode about 1860, at a time when the yield gold in California was decreasing, caused the greatest "rush" known in e history of western mining. Thousands of persons hurried over the erra Nevada, in the hope of locating a paying claim; other thousands llowed to open saloons, gambling resorts, and "opera houses," and thus, e parasites, to live upon the miners. The rapid growth of Virginia City d a few other mining "camps" was the excuse for the admission of evada as a State in 1864; a most unfortunate political necessity, for in ite of its enormous area, exceeding that of many eastern States com-ned, its population has fallen under 50,000, less than that of many cities the second class. Virginia City is now reduced to a mere shadow of its ort-lived greatness. The population of the State must always be scanty, attered, and isolated.

THE PACIFIC SLOPE

The Pacific Ranges, broadly separated from the Rocky Mountains, clude the lofty Sierra Nevada of California, the Cascade Mountains of regon and Washington, and several smaller coast ranges. The highest mmits are in the granitic southern part of the Sierra Nevada, where ount Whitney nearly reaches 15,000 feet. The Sierra is precipitous on e east, descending abruptly into the Basin Range region and shedding eat slopes of stony waste, varied about Mono lake by superb moraines of tinct glaciers. The descent on the west is much more gradual; here many the interstream highlands have the appearance of somewhat uneven clined planes, separated by deep-cut canyons. All these features suggest at the range as a whole may be regarded as a huge block, uplifted on e east long enough ago to be deeply scored by the streams from its crest. mong the valleys the Yo-Semite is phenomenally deep, with precipitous lls of granite. The Hetch-hetchy valley is of similar form, but of naller dimensions, a little further north. The range is crossed only by t river, which rises on the western part of the Columbia plateau, enches through the range and joins the Sacramento system. Great flows lava and sheets of volcanic conglomerates lie on the western slope of e range about its middle, the date of their eruption being earlier than at of the valley cutting. Further north volcanic cones and recent lava ws become more abundant.

The higher summits of the Cascade Range are all volcanic cones more less dissected by radiating valleys, the chief being Mounts Rainier, St. lens, and Hood. They bear heavy snowfields and glaciers. Mount

Shasta, in northern California, is an isolated volcano, west of the hig ranges, one of the most symmetrical and least dissected of the larger co Crater lake in southern Oregon occupies a huge caldera ; once a lofty c furrowed by radial valleys, the upper part has been removed by eng ment, leaving a great cavity, with precipitous inner walls, four mile diameter and one mile deep. The lost summit of the cone has been ch tened Mount Mazama by a club of mountain climbers of that name, v have done much to make the caldera better known. The Columbia Klamath rivers break through the mountains in deep gorges on their from the lava plateaux to the sea.

The Coast Ranges are of moderate altitude, well dissected by numer valleys, and frequently descending directly to the ocean shore in cipitous cliffs and headlands. Many signs of change of level are fo in raised beaches and submerged valleys ; but owing to the gen parallelism of the ridges and the coast line, and to the absence of rec strong depression, the shore has few strong re-entrants. The range is rich in metalliferous deposits, save at *New Almaden*, where there has b a large yield of mercury.

The broad troughs between the Coast Ranges and the higher mo tains further inland are floored with waste from the mountain valleys. California the waste-strewn floor makes a plain of great extent, the fans of detritus that are spread out before every mountain valley be admirably adapted to the distribution of water by irrigating canals. intermont trough is much less distinctly developed on the path of Klamath river, where the adjacent ranges approach one another in a n of irregular relief. Further north it reappears, and is partly occupied the branching waters of Puget Sound. Here recent studies lead to conclusion that the waste-built lowlands adjoining the sound are glacial aqueo-glacial deposits, while the trunk and branches of the sound are spaces once occupied by many confluent ice streams that came down fr the mountains in the glacial period. The many degrees of latitude that traversed in passing along the Pacific slope from the desert lowla between the Basin Ranges of south-eastern California over the g valley of California to the forested valley of Puget Sound, explain climatic contrasts between the arid and humid extremes of this belt. T resemble each other only in their relatively small seasonal changes, being persistently warm and dry, the other persistently cool and wet.

People and Towns of the Pacific Coast.—The settlement of Valley of California by Spanish Americans was well advanced before discovery of gold caused the inrush of fortune-seekers from the east United States and Europe in 1849 and 1850. Spanish names still pre derate, as in *Sacramento*, the capital, *San Francisco*, the great Pacific p at the only break in the California coast range, *Los Angelos* and *San Di* on the coast further south. The old Spanish mission churches are the antiquities of the State having European associations. In those early

le raising on the great valley plain was the main industry, and hides e the chief article of export. With the acquisition of the territory by United States and the incursion of gold seekers, a new order of things inaugurated; a rough and violent order at first when "vigilance com-tees" put their prompt measures in the place of the slower procedure he law courts.

The newcomers made their way thither by long voyages in sailing ships nd Cape Horn, by shorter voyages with a land passage across the arial isthmus of Darien, and by a difficult and dangerous overland rney in white-covered waggons or "prairie-schooners." The hardships the overland passage across plains, mountains, and desert basins, are g to be remembered; Indian ambuscade, thirst in the dry country, and l storms in the Sierra overcame many a pioneer emigrant. The sur-ors are justly proud of their record as "'49-ers." Gold was taken from rtz veins in the metamorphic rocks of the lower Sierras, and from acers" or gravel deposits in the t hills; but in the ten years from o to 1860 the great increase of ulation and the exhaustion of ny mines and "diggings" turned ntion to the fertility of the great ley plain, the cattle ranches were laced by farms, and California ame a great wheat-raising State. e second decade was marked by construction of a trans-conti-tal railroad, completed in 1866, California then ceased to be listant part of the Union. In r years the number of railroads oss the continent (Fig. 336) has increased to five—not counting the adian Pacific Railway—each line now being largely dependent carrying cattle and farm products by the way, as well as on through sengers and freights. Beautiful winter resorts attract thousands of ople to the tempered Pacific coast from the violent climate of the erior. The irrigated plains of southern California are now occupied by ensive vineyards and fruit ranches, from which eastern markets are gely supplied. At the same time the more northern railroads have pro-oted the growth of *Portland*, *Tacoma*, and *Seattle* on the harbours of the north-west; the great forests on the littoral slopes of Oregon and shington are being sawed into lumber for the distant plains and iries. The purchase of Alaska and more recently the discovery of the ondike gold-field, has encouraged traffic along the north-western coast. ans-Pacific commerce has in the meantime grown apace, and with it me an incursion of Chinamen, patient and industrious workers, living on

FIG. 367.—*The Site of San Francisco.*

a fraction of what would be required for an ambitious American, making the United States their home, but hoping to return to China a or dead ; a useful element in a country where serfdom prevailed, but desirable citizens for a free republic. The manifest lesson to be dra from the great intelligence and prosperity of the people in the no eastern quarter of the United States is that all immigrants must make country a permanent home for themselves and their children ; that t must accept the rights and duties of citizenship as well as the respo bility of self-support and self-improvement ; and that from the uni mass thus formed no barrier of race, religion or foreign fealty s obstruct the rise of leaders, to guide the people in the further deve ment of the United States.

Alaska.—The north-western extremity of North America, constitu the territory of Alaska, 580,000 square miles in area (about one-sixth of area of United States) was bought from Russia for $7,200,000 in 1867. has a small native population of various Indian tribes, and a growing w population bent on the development of its resources. The compact l body, approaching within 54 miles of Asia, and bounded on the east by 141st meridian, has an arm 500 miles long extending south-east along coast, and including a narrow strip of mainland as well as the count islands of the Alexander Archipelago. *Sitka*, the territorial capita situated on Baranof Island in this group. There is a second arm, 1 miles in length, composed of the volcanic Aleutian Islands, looping ac the northern Pacific from Alaska Peninsula towards Kamchatka. coast line is extremely irregular on the south, measuring in total 18 miles, or more than that of all the United States.

The southern coast is bold and mountainous. Mount St. Elias, pra cally on the frontier at the base of the south-eastern arm, rises hig than 18,000 feet. The heavy snowfall forms immense glaciers, descend to the sea, the largest being the Malaspina glacier, fed by snow-field the St. Elias range. Muir glacier, further south-east, is annually vis by many tourists. The temperature on the mountain flanks is mode and equable, favouring the growth of heavy forests along the coast as as Kadiac Island, at the base of the Aleutian chain. The interior is l known, except along the course of the Yukon, one of the great rivers o world. Its climate is drier than on the coast, and the seasonal change temperature are greater ; extreme cold is felt in winter, and the groun frozen to a depth estimated at 100 feet. Here the vegetation is chie dense cover of moss. On the north coast, far within the Arctic ci layers of ice are seen beneath the surface soil.

The economic products of Alaska come at present chiefly from the fisheries of the Pribilof Islands (north of the Aleutian chain), and from gold-fields of the Yukon valley and the coast of Bering Sea. The have been reduced from their originally countless numbers by too less destruction, but if their capture is properly restricted they

ld a large revenue to the Government as well as a profit to the sealers many years to come. Gold deposits of moderate value have been rked for about thirty years past at various points on the Alexander chipelago. In the autumn of 1896 the Klondike field in the Canadian kon District was discovered, and when the news of its richness reached United States in the following spring, there was a "rush" of would-be ners that recalls early Californian days.

Alaska is of especial interest as the first outlying territorial addition to United States. Its purchase provoked much criticism, and even icule, yet as a financial investment it has been profitable. Its adminis-tion has been thus far comparatively simple, for its population has been too small for any question to arise as to its accession to Statehood. ite different political problems must arise in the more populous detached ritories in a genial climate which have recently been brought under the ay of the United States.

STATISTICS.

AREA AND POPULATION OF THE UNITED STATES.

	Area.	Population.			Date of Admission.		
	sq. miles.	1880.	1890.	1900.	Territory.	State.	
bama..	52,250	1,262,505	1,513,017	1,828,697	1817	1819	Ala.
zona	113,020	40,440	59,620	122,931	1863	—	Ariz
ansas	53,850	802,525	1,128,179	1,311,564	1819	1836	Ark.
ornia	158,360	864,694	1,208,130	1,485,053	—	1850	Cal.
orado	103,925	194,327	412,198	539,700	1861	1876	Col.
necticut	4,990	622,700	746,258	908,420	Original State.		Conn.
laware	2,360	146,608	168,493	184,735	"	"	Del.
trict of Columbia ..	70	117,624	230,392	278,718	1791	—	D. C.
rida	58,680	269,493	391,422	528,542	1822	1845	Fla.
rgia	59,475	1,542,180	1,837,353	2,216,331	Original State.		Ga.
ho	81,800	32,610	84,385	161,772	1863	1890	Id.
nois	56,650	3,077,871	3,826,351	4,821,550	1809	1818	Ill.
liana	36,350	1,978,301	2,192,404	2,516,462	1800	1816	Ind.
lian Territory ..	31,400	—	—	392,060	—	—	I. T.
wa	56,025	1,624,615	1,911,896	2,231,853	1838	1845	Iowa.
nsas	82,080	900,096	1,427,096	1,470,495	1854	1861	Kans.
ntucky	40,400	1,648,600	1,858,635	2,147,174	—	1792	Ky.
uisiana	48,720	939,946	1,118,587	1,381,025	1805	1812	La.
ine	33,040	648,936	661,086	694,466	—	1820	Me.
ryland	12,210	934,943	1,042,390	1,188,044	Original State.		Md.
ssachusetts	8,315	1,783,085	2,238,943	2,805,346	"	"	Mass.
chigan	58,915	1,636,937	2,093,889	2,420,982	1805	1837	Mich.
nnesota	83,365	780,773	1,301,826	1,751,394	1849	1858	Minn.
ssissippi	46,810	1,131,597	1,289,600	1,551,270	1798	1817	Miss.
ssouri	69,415	2,168,380	2,679,184	3,106,665	1812	1821	Mo.
ntana	146,080	39,159	132,159	243,329	1864	1889	Mont.
braska	77,510	452,402	1,058,910	1,066,300	1854	1867	Nebr.
vada	110,700	62,266	45,761[1]	42,335	1861	1864	Nev.
w Hampshire ..	9,305	346,991	376,530	411,588	Original State.		N. H.
w Jersey	8,175	1,131,116	1,444,933	1,883,669	"	"	N. J.
w Mexico	122,580	119,565	153,593	195,310	1850	—	N. M.
w York	49,220	5,082,871	5,997,853	7,268,894	Original State.		N. Y.
rth Carolina ..	52,250	1,399,750	1,617,947	1,893,810	"	"	N. C.
rth Dakota	70,795	135,177[2]	182,719	319,146	1861	1889	N. Dak
io	41,000	3,198,062	3,672,316	4,157,545	—	1802	O.
lahoma	39,030	—	61,834	398,331	1890	—	Ok. T.
egon	96,030	174,768	313,767	413,536	1848	1859	Ore.
nsylvania	45,215	4,282,891	5,258,014	6,302,115	Original State.		Pa.
ode Island	1,250	276,531	345,506	428,556	"	"	R. I.
uth Carolina.. ..	30,570	995,577	1,151,149	1,340,316	"	"	S. C.

[1] Decrease.

[2] Including South Dakota.

AREA AND POPULATION OF THE UNITED STATES—(*continued*).

	Area. sq. miles.	Population. 1880.	1890.	1900.	Date of Admission Territory.	State.
South Dakota	77,650	See N. Dakota.	328,808	401,570	1861	1889 S.
Tennessee	42,050	1,542,359	1,767,518	2,020,616	—	1796 Te
Texas	265,780	1,591,749	2,235,523	3,048,710	—	1845 Te
Utah	84,970	143,963	207,905	276,749	1850	1896 U.
Vermont	9,565	332,286	332,422	343,641	—	1791 Vt
Virginia	42,450	1,512,565	1,655,980	1,854,184	Original State.	Va
Washington	69,180	75,116	349,390	518,103	1853	1889 W
West Virginia	24,780	618,457	762,794	958,800	—	1863 W
Wisconsin	56,040	1,315,497	1,686,880	2,069,042	1836	1848 W
Wyoming	97,890	20,789	60,705	92,531	1868	1890 W
United States ..	3,022,600	50,155,783	62,622,250	76,085,794		

POPULATION BY BIRTH.

	1890.	1900.		
England	909,092	.. .. ..	842,078	
Wales	100,079	.. .. ..	93,682	
Scotland	242,231	.. .. ..	233,977	
Ireland	1,871,509	.. .. ..	1,618,567	
United Kingdom	3,122,911	.. .. ..		2,788,304
Germany	2,784,894	.. .. ..		2,666,990
Canada and Newfoundland	980,938	.. .. ..		1,181,255
Sweden and Norway	800,706	.. .. ..		910,025
Russia and Poland	330,084	.. .. ..		807,606
Italy	—	.. .. ..		484,207
Austria-Hungary	303,812	.. .. ..		579,042
China	106,688	.. .. ..		81,827
Other Foreign Countries	819,514	.. .. ..		857,388
Total Foreign Born	.. .. ..	9,249,547	.. .. ..	10,3
Coloured, Native Born	.. .. ..	7,470,040	.. .. ..	8,8
White, Native Born	.. .. ..	45,902,663	.. .. ..	57,8
Total Population of United States (excluding Alaska)		62,622,250		77,0

POPULATION OF THE LARGER CITIES OF THE UNITED STATES.

	1890.	1900.		1890.	1900.
New York, N.Y. ..	1,515,301	3,437,202[1]	Worcester, Mass. ..	84,655	118,421
Chicago, Ill. ..	1,099,850	1,698,575	Syracuse, N.Y. ..	88,143	108,374
Philadelphia, Pa. ..	1,046,964	1,293,697	New Haven, Conn. ..	81,298	108,027
Brooklyn, N.Y. ..	806,343	—	Paterson, N.J. ..	78,347	105,171
St. Louis, Mo. ..	451,770	575,238	Fall River, Mass. ..	74,398	104,863
Boston, Mass. ..	448,477	560,892	St. Joseph, Mo. ..	52,324	102,979
Baltimore, Md. ..	434,439	508,957	Omaha, Neb. ..	140,452	102,555
Cleveland, O. ..	261,353	381,768	Los Angeles, Cal. ..	50,395	102,479
Buffalo, N.Y. ..	255,669	352,387	Memphis, Tenn. ..	64,495	102,320
San Francisco, Cal. ..	298,997	342,782	Scranton, Pa. ..	75,215	102,026
Cincinnati, O. ..	296,908	325,902	Lowell, Mass. ..	77,696	94,969
Pittsburg, Pa. ..	238,617	321,616	Albany, N.Y. ..	94,923	94,151
New Orleans, La. ..	242,039	287,104	Cambridge, Mass. ..	70,028	91,886
Detroit, Mich. ..	205,876	285,704	Portland, Ore. ..	46,385	90,426
Milwaukee, Wis. ..	204,468	285,315	Atlanta, Ga. ..	65,533	89,872
Washington, D.C. ..	230,392	278,718	Grand Rapids, Mich. ..	60,278	87,565
Newark, N.J. ..	181,830	246,070	Dayton, O. ..	61,220	85,333
Jersey City, N.J. ..	163,003	206,433	Richmond, Va. ..	81,388	85,050
Louisville, Ky. ..	161,129	204,731	Nashville, Tenn. ..	76,168	80,865
Minneapolis, Minn. ..	164,738	202,718	Seattle Wash. ..	42,837	80,671
Providence, R.I. ..	132,146	175,597	Hartford, Conn. ..	53,230	79,850
Indianapolis, Ind. ..	105,436	169,164	Reading, Pa. ..	58,661	78,961
Kansas City, Mo. ..	132,716	163,752	Wilmington, Del ..	81,431	76,508
St. Paul, Minn. ..	133,156	163,065	Camden, N.J. ..	58,313	75,935
Rochester, N.Y. ..	133,896	162,608	Trenton, N.Y. ..	57,458	73,307
Denver, Col. ..	106,713	133,859	Bridgeport, Conn. ..	48,866	70,996
Toledo, O. ..	81,434	131,822	Lynn, Mass. ..	55,727	68,513
Allegheny, Pa. ..	105,287	129,896	Lawrence, Mass. ..	44,654	62,559
Columbus, O. ..	88,150	125,560	Des Moines, Iowa ..	50,093	62,139

LAND UNDER CROPS IN 1901.

Crop ..	Indian Corn.	Wheat.	Oats.	Cotton.	Barley.	Potatoes.[2]
Acres ..	91,350,000	49,896,000	28,541,000	27,532,000	4,206,000	2,611,000

[1] Includes Brooklyn.

[2] In 1900.

CHIEF WHEAT-GROWING STATES, 1901.

State	Kansas.	Minnesota.	N. Dakota.	S. Dakota.	Nebraska.	United States.
Million bushels ..	99·1	80·1	59·3	51·7	42·0	748·5

CHIEF COTTON-GROWING STATES, 1899.

State	Texas.	Georgia.	Mississipi.	Alabama.	S. Carolina.	United States.
Bales of Raw Cotton	2,438,000	1,346,000	1,204,000	1,025,000	831,000	9,143,000

CHIEF MINERAL PRODUCTIONS IN 1901.

Product	Bituminous Coal.[1]	Anthracite.	Pig Iron.	Gold.	Silver.
Amount—tons ..	201,630,000	60,242,000	15,878,000[2]	—	—
Value—£	47,300,000	22,500,000	48,400,000	15,730,000	14,270,000

GROWTH OF RAILWAYS IN THE UNITED STATES.

Date	1830.	1850.	1870.	1890.	1900.
Miles open	23	9,021	52,922	169,698	194,334

ANNUAL TRADE OF UNITED STATES (*in pounds sterling*).

	1871–75.		1881–85.		1891–95.
Imports	115,600,000	..	133,400,000	..	157,000,000
Exports	97,200,000	..	154,900,000	..	174,500,000

DESTINATION AND ORIGIN OF FOREIGN TRADE.

(Percentage of total in 1896.)

Country.	Exports to.		Imports from.		Total Trade.
United Kingdom	46·3	..	23·1	..	30·4
Germany	12·1	..	14·5	..	13·1
France	5·4	..	8·9	..	6·8
British North America	5·7	..	5·3	..	5·6
Brazil	1·2	..	9·0	..	4·4
Netherlands	4·8	..	1·7	..	3·3
Belgium	3·1	..	1·7	..	2·6
Italy	2·1	..	2·5	..	2·2
Mexico	2·2	..	2·3	..	2·2
Japan	1·3	..	3·1	..	2·1
China	1·2	..	2·6	..	1·8
Other Countries	14·6	..	25·3	..	19·3
Total	100·0		100·0		100·0

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J. Bryce. "The American Commonwealth." 2 vols. London, 1893–95.
"Reports of the Eleventh Census, 1890." ca. 20 vols. Washington.
"Reports of U.S. Bureau of Ethnology." Volumes published at frequent intervals. Washington.
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[1] For development of coal production (Anthracite and Bituminous) see curve in Fig. 70.
[2] In 1902 the production exceeded 17,800,000 tons.

CHAPTER XL.—MEXICO

By Angelo Heilprin,

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Position and Extent.—The Republic of Mexico (Spanish, *Méx*
which bounds the United States on the south, lies between latitudes
and 14½° N., and the meridians 86½° and 117° W. of Greenwich.
its north and south extent it thus lies almost equally within and with
the tropics. The boundary line with the United States, which was de
mined by treaties in 1848 and 1853, has a length of 1,833 miles, of wh
1,130 are constituted by the Rio Grande, from the mouth of that stre
in the Gulf of Mexico upwards. The boundary with Guatemala, wh
was finally adjusted by treaty in 1895, fixes the southern point of
republic almost at the mouth of the Zachiate river. The area of
country, inclusive of a few small outlying islands, is some 767,000 squ
miles, or approximately three times that of Austria-Hungary. Mexico
two peninsular parts—the peninsula of Lower California (officially, *B*
California) and Yucatan, the latter properly comprising the two State
Yucatan and Campeche. The great Gulf of California, which separ
the main mass of the republic from Lower California and receives a
northern extremity the Colorado River from the United States, occu
seemingly the position of a sunken block of the Earth's crust which br
continuity between what is now the peninsular apex and the protrud
coastline of the State of Jalisco.

Configuration.—Mexico is pre-eminently a region of mountain ele
tions, but this is not always to be recognised in the interior on acco
of the development of a broad elevated tableland whose flat or ge
undulating surface, rising from the depression of the Rio Grande
graduated altitudes of 6,000, 7,000, and 8,000 feet, or even more, m
the configuration of the land. Much of this plateau has been for
through a progressive and long-continued accumulation of detrital mate
representing in part the distributed products resulting from moun
destruction and in greater part the discharges from an almost enc
number of volcanic openings. These have, as it were, filled the orig
valleys to their lips, and it is thus upon the new surface that the r
recent or existing valleys have been imposed. In this conception,
great central plateau of Mexico is not of tectonic construction, but m
a filled up series of troughs, not wholly unlike the snow-accumul
tableland of Greenland, through whose margins alone the buried m

s protrude their summit-peaks. In Mexico, too, especially in the loftier s of the plateau, buried mountains rear their summits as "islands" above enveloping mass; elsewhere they make continuous ridges or chains, se crest-lines may be as much as 10,000 feet above the sea. The east west flanks of the plateau clearly reveal their mountain origin, and heir sudden plunge to the lowlands the Sierra Madre Oriental and the ra Madre Occidental—as the two main lines of bulwarks and their ifications are vaguely designated—present some of the most marked sical features, and at the same time some of the sublimest views of ure, that are to be met with on the Earth's surface. What relation the xican Cordilleras bear to the main Rocky Mountain system of North erica has not yet been definitely determined, but that they do not con- ute that integral part which was at one time assumed, is certain; and emains for further investigation to ascertain the relationship, if any h exists, with the South American Andes.

Volcanoes.—The volcanoes of Mexico are very numerous, and they stitute the highest relief of the land. The loftiest of these are: laltepetl, the "Star Mountain"—commonly known as the Peak of zaba—(18,250 feet), ranking, with the possible exception of Mount gan, as the highest summit of the North American continent; Popo- epetl, the "Smoking Mountain" (17,520 feet); Ixtaccihuatl, the "White man" (16,960 feet); Nevado de Toluca (14,950 feet); Malinche (Mat- uevatl, 13,460 feet); Cofre de Perote (Nauhcampatepetl, 13,400 feet); vado de Colima (14,210 feet); Volcan de Colima (12,990 feet); Cerro de isco (12,700 feet); and Tancitaro (12,650 feet). The first two of these, h resting with one foot on the plateau, might properly be considered dormant cones, since they continue to exhale from perfectly preserved ters aqueous and sulphurous vapours; they are amongst the most ratifully formed of volcanic mountains. Ixtaccihuatl is manifestly broken-down and dismantled volcano, having to-day the contour of ne of the silenced volcanic peaks of the equatorial Andes, such as tisana: similar wrecks are the Nevado de Toluca (in whose crater ne of the most elevated lakes of the globe) and the Cofre de Perote. ima is the most active volcano of the land, its eruptions having been ost unremitting for many years. Its position off the plateau, on the Pacific pe, allies it with Jorullo—a mountain of only Vesuvian proportions, made ous by Humboldt's recital of its terrific constructive eruption of 1759–63. ted columns of air, with a temperature of 167° F., still rise from the ter-walls of this forest-clad mountain. Some efforts have been made geographers and geologists to prove that the principal volcanic cones situated on one or more main lines of fissure which traverse the region in extended east and west course; and it has even been contended that southern edge of the plateau was coincident with one of these lines, this still remains to be demonstrated. The snow-line in the region of higher summits being found but little below 15,000 feet, only three

of the peaks—Orizaba, Popocatepetl, and Ixtaccihuatl—are perpetu snow-clad, although the names of two other summits—Nevado de To and Nevado de Colima—signify ice-mountain. The writer has seen Nevado de Toluca entirely destitute of either snow or ice. Only Ixtaccihuatl does the ice-cap acquire a development sufficient to form glaciers.

Rivers and Lakes.—Mexico is singularly deficient in large perma streams, and the Mexican rivers offer but little opportunity to naviga Apart from the Rio Grande, which at times becomes almost dry betw El Paso and Presidio del Norte in consequence of irrigation tapping New Mexico, the most important waterways are the Rio Conchos in north, the Rio Lerma, or Santiago, and Rio de las Balsas (Mescala)—l flowing to the Pacific—in the south, and the Grijalva and Usumac in the State of Chiapas, east of the isthmus of Tehuantepec. About fif miles from the city of Guadalajara the Lerma is precipitated over magnificent fall of Juanacatlan, the "Niagara of Mexico." Nearly parts of the country are gashed by deep troughs or excavated wa channels (*barrancas*), many of which are waterless during the dry seas but, after the rains, are wild with the tumult of tumbling waters, to wh revivifying influence a luxurious vegetation responds.

There are no really large lakes in the republic, that of Chapla on Lerma, in the state of Jalisco, being the largest ; but Cuitzeo and Patzcu in the State of Michoacan, are tremely picturesque. Six lacust basins, covering considerable a but with very insignificant de occupy much of the valley of City of Mexico, or the true p of Anahuac, but their waters merely relics of the much la extent which they formerly o pied. At the time of the Spa conquest, the City of Mexico, a city of islands, being compl surrounded by the waters of L Texcoco. At the time of H boldt's visit the western borders of that lake occupied a position about mile to the eastward of the city limits ; now, except in time of floods, distance is about doubled. The depth of water in the lake at the pr day, under normal conditions, hardly exceeds two feet over a part of its area. The Mexican capital has at various times inundated by the flooding of these lakes, and on account of the se of the city discharging into a lake without outlet epidemic malarial gastric fevers have been common, and their ravages have only been ch by the benefits of a climate of 7,000 feet elevation. As it is, the deatl

FIG. 308.—*The Valley of Mexico.*

he Mexican capital, 40 per 1,000, is the highest of any city in the ised world. The problem of drainage has thus become so serious that greatest drainage system and one of the most remarkable engineering rprises in the world was commenced in 1865 and completed in 1898. *desague*, as the work is called, comprises a canal forty-three miles in th and a tunnel somewhat exceeding six miles, the latter discharging the valley of Tequixquiac, due north of Lake Zumpango.

Climate.—The tropical position of Mexico, combined with its high ation, necessarily ensures to the land a variety of climatic conditions. It is ordinarily considered to be a stifling tropical temperature charac- es the lowland region -at least, its southern half for the greater part he year, the maximum temperature at Mérida (Yucatan), Mazatlan, Colima, not infrequently reaches 105° F. Ordinarily the summer heat ot more oppressive than in the southern or central United States, and g the immediate ocean border it is tempered by indraughts of cool ir. Over the greater part of the plateau-surface a mild temperate ate prevails, the temperature in summer rarely rising above 88° or 90°, winter falling much below the freezing point. Snow in the Mexican tal is an extreme rarity, but it is not absolutely unknown.

n a general way the Mexicans recognise three superimposed zones of ate : the hot zone, or *tierra caliente*, extending from sea-level to about o feet of elevation ; the temperate zone, *tierra templada*, between 3,000 5,000 feet ; and the cold zone, *tierra fria*, comprising the land above o feet. Manifestly this zonal distribution of climate, in a region whose idianal extent is upwards of 1,200 miles, differs considerably for the hern and southern sections of the country. Two well-marked seasonal litions characterise much or most of the region. The rainy season, ch occurs between May or June and October or November, brings joy ne landscape of Mexico, when the slumbering forces of vegetable and nal nature are again called into activity. During the height of the y season torrential rain falls almost daily, especially between the hours two to four in the afternoon. In the dry season little or no rain falls. highest rainfall appears to be at about Monterey, in the State of Nuevo n, where an annual average of about 130 inches has been established ; te region about the City of Mexico, which represents the conditions large part of the plateau, the annual precipitation is about 25 inches. alapa, situated (at an elevation of 4,400 feet) on the coastal slope of the f of Mexico, the number of rainy days per year has been known to ed 200. The conditions of rainfall throughout much of the land have uestionably been greatly modified since the period of the Spanish uest, as a result of extensive deforestation.

Flora and Fauna.—The Mexican flora naturally combines most rse features. Dense and exuberant tropical jungles cover much of low-lying tracts and the basal 2,000 to 3,000 feet of the mountain rities. The forest is still in greater part virgin, and access to it

is obtained chiefly along the highways and the different waterways t
irregularly thread through it. Among the dominant arboreal types of t
tract may be mentioned the palms, figs (rubber-trees), cæsalpinias, and ot
acacias, the rosewood, and mahogany; the huge fig-trees are especi
remarkable with their buttressed trunks. Hardly less imposing are
giant mangroves at various points on the coast of Yucatan. The z
between 4,500 and 6,000 feet, characterised by a superb growth of ev
green oaks, of melastomas, and in its lower part of an almost bewilder
variety of orchidaceous plants, may be said to constitute the transit
tract between the distinctively tropical and temperate floras; above
is succeeded by the ordinary types of oaks and by the pine, spruce
fir among conifers. The latter ascend the high volcanoes to about 13,
feet, forming magnificent forests at elevations of 9,000 to 10,000 feet.
"zones of vegetation," so called, can be made out with fair regularity,
the overlaps are remarkable for their vertical displacements. Thus, on
limestone ridges of the Yautepec, south of the central plateau, palms g
luxuriantly up to 7,500 feet; per contra, the pine is not infrequently
with down to an elevation of 3,000 feet or less. The most striking exh
tions of cactus growth—in which Mexico stands pre-eminent—are fo
on the lower plains of Yucatan and in the arboreal masses, which, at
elevation of some 6,000 feet, clothe the mountains south of Tehuacan.

Mexico enjoys a wealth of tropical and subtropical fruits, such as
orange, pine-apple, banana, coco-nut, pomegranate, anona, sapote, mar
and papaw, and loses correspondingly in the quality or flavour of n
fruits of temperate climes. Among the special products of cultivat
indigenous or introduced, are the sugar-cane, cacao, coffee, vanilla,
agave, or American aloe. The last named, in Yucatan chiefly, furnis
the sisal hemp or fibre, while in major Mexico, an allied species yields
fermented national beverage known as *pulque*—the curse of beggard
and the wealth of the endless *pulquerias* where it is sold.

The fauna of Mexico is necessarily a mixture of the faunas of So
America and of the United States, the lowlands representing the eleme
of the former and the highlands of the latter. Zoogeographically it
transition tract. The larger or more distinctive quadrupeds include the ta
jaguar (*tigre*, with a range extending nearly or quite to the Texan fronti
ocelot, puma or cougar, coyote (prairie-wolf), peccary (ranging to Arkans
ant-eater, and armadillo. Several species of monkey find a congenial h
southward of the 19th parallel, but at least one form, as in the *sapot*
or sapote forests of the northern coast of Yucatan, reaches the 21st para
The birds are of great variety. Standing at the edge of the great pla
the traveller may be beguiled by the tones of the robin or mocking-b
and three hours later by foot-walk his feathered companions will be
toucan, chattering parrots, the humming-bird, and cassique, or hang
Alligators, and perhaps even the American crocodile, are abundant in s
of the lowland streams, as well as in bays and estuaries, and ordinarily

e much more in evidence than the ophidians, large and small, which elong to the forest tract. Non-venomous water-snakes are singularly merous in some of the plateau lakes. As special faunal elements should e mentioned the remarkable tailed amphibian axolotl, and from among sects, the travelling or foraging ants and nest-constructing termites.

People.—The inhabitants of Mexico resolve themselves into three tegories: native Indians, of some 40 to 50 tribes; Spaniards, or the escendants of the conquerors of Mexico, together with representatives other European races; and the mixed people resulting from a union these two, who are often spoken of simply as *Mexicans*. Probably bout 19 per cent. of the people are of European descent, 38 per cent. re native Indians, and 43 per cent. mixed races Mexicans). It would appear that the native population has been steadily decreasing since the beginning of the nineteenth century. The Mexican ndians, with certain exceptions (Apaches, Comanches, eris), are of a less warlike disposition than the ndians of the farther north, and, on the whole, may e said to be a hard-working, moral, and sober people, istinctly inclined to the arts of peace. Little or no rejudice exists against them as a race, and where y station or education they have advanced to a pecial grade of civilisation, they are accepted in marriage among the ighest families of Spanish blood. They are kindly, courteous and ignified in mien and disposition, easily recognising the position which ney occupy, and law-abiding to a most generous extent.

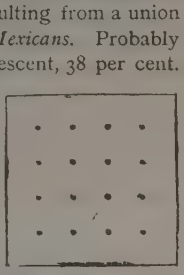

FIG. 369.—*Average population of a square mile of Mexico.*

The most important of the hundred modern languages of Mexico are ne Mexican (Nahuatl Aztec), Comanche - Shoshone, Mixteco - Zapoteca, Maya-Quiché and Otomi. The Nahua tribe of the *Mexica* (Mexicans) erives its name from *Mexitl*, a word of obscure origin and meaning, but ften assumed to be synonymous with Huitzilopochtli, the Mexican God f War. That Mexica and Azteca (the people from Aztlan, "the land of ne white heron") define the same people—a people migrating in from the orth—admits of no doubt; hence, we may assume that Mexicans and Aztecs (including the Toltecs, who appear to have been only Mexicans rom the region about Tula, and not an earlier independent migratory orde) represent in part the people who were ruled by the various kings nd monarchs styled Motecuzoma, Moctezuma or Montezuma.

To what period of construction belong the monumental ruins that are cattered through southern Mexico—in Uxmal and Chichen-Itza in Yucatan, f Palenque in the State of Chiapas, or of Mitla in the State of Oaxaca—till remains to be determined, although recent research does not seem o demand an antiquity exceeding 700 to 1,000 years.

History and Government.—When conquered by Cortez in 1521 Mexico was called the Province of New Spain: it remained a

dependency of the Spanish crown for precisely three centuries, and w
ruled succe sively by Governors, Audencias, and Viceroys. On Septemb
27, 1821, the Spanish power in Mexico finally terminated, after a strugg
of eleven years. An Empire was proclaimed early in 1822; but this w

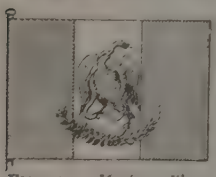

FIG 370.—*Mexican Flag.*

followed by the proclamation of a Republica
Constitution in 1824. A generally stormy perio
led up to the war with the United States (Apri
1846, to September, 1847). After some dete
mined resistance on the part of the Mexican
Maximilian, Archduke of Austria, as the represe
tative of Napoleon III. of France, was placed upo
the throne of Mexico in 1864, and thus was const
tuted the second Empire. After the fall of the empire and the execution
the emperor in 1867 the Republic was re-established and became prosperou

Mexico is now organised as a Federal Republic, composed of twenty
seven States, two territories, and one federal district, whose politic
organisation is almost identical with that of the United States. The powe
of the government are vested in the Legislative, Executive, and Judici
bodies, the first-named consisting of a House of Representatives and
a Senate, representation in which is brought about by the suffrages of th
people. The Executive or President is elected by electors popularly chose
and holds office for four years; there is no provision forbidding re-electio

Industries.—Mexico is one of the richest mining countries of th
world, her mineral resources, which are as yet only partially develope
comprising gold, silver, platinum, copper, lead, iron and mercury. Th
annual output of silver is now claimed to be in value nearly £12,000,00
and of gold about £1,000,000. The main silver mines are comprised
the mining districts of Guanajuato, Zacatecas, and Catorce. An extensi
industry is carried on in opals (principally from the region of Querétar
and in the so-called "Mexican onyx," a beautifully shaded stalagmit
calcite which occurs in interbedded layers in the State of Puebla.

There are extensive manufactures of cotton and woollen goods (cloth
blankets, shawls), of leather (saddles and accessory trappings, shoes), a
of felt and straw (hats); the pottery of Guadalajara is famous.

The cultivation of coffee is destined to become one of the forem
industries of the land, the lower tracts of the *tierra caliente* being particula
favourable to its growth. The coffee of Cordoba ranks but little infe
to the best coffee of the New World. Agriculture, although extensiv
practised, has in many districts hardly passed a primitive or experimen
stage, and it is no uncommon thing to see the ancient forked or hooked s
serving for the plough-share. An equally primitive condition of the ro
ways and of transportation equipments prevails, transport over large are
being still almost exclusively by donkeys. During late years the
has been an astonishing development of railroad enterprises, the len
of roads operated by steam being, in 1901, over 9,500 miles. Two tr

es—the Mexican Central and the Mexican National—connect the City Mexico with the United States frontier. The Mexican Railway, con-cting the capital with Vera Cruz, was officially opened in 1873, and mains one of the most remarkable pieces of railroad construction.

Towns.—*Mexico* (Fig. 308), the ancient Tenochtitlan, capital of the deral District and of the Republic of Mexico, is situated at an elevation of 50 feet above the sea-level. It combines the sumptuousness of a little ris with the beggardom of Naples, the activity of a city of the north with full inactivity of cities of the south. Here was established, in 1530, the oneer printing press of America, and, in 1693, the first newspaper *eurio Volante*) of the New World. Schools, colleges, hospitals, and lums flourish in abundance. The National Museum contains a most portant collection of American antiquities—a treasure-house to the haeologist and ethnologist. The School of Fine Arts, or Academy of n Carlos, occupies the site where Fray Pedro de Gante, in 1524, founded first school in the New World. The architectural features of the city predominantly Spanish, the "palaces" of the wealthier classes down to dingy shops of the poorer tradespeople, together with the arcades, nicipal buildings, and churches, having fully accepted the controlling es of Old Spain. The most striking edifice is the cathedral, the largest d most sumptuous church of America, erected on the site of the pyramidal mple of the titular god of the Aztecs.

The most important ports or harbours of Mexico are, on the Pacific e, Mazatlan, San Blas, Manzanillo, and Acapulco; and, on the Gulf ast, Tampico, Vera Cruz, Coatzacoalcos, Campeche, and Progreso (the t two in Yucatan). *Acapulco* has been described as the most beautiful cific port of all America, and, after Sydney, the finest harbour in the rld. *Vera Cruz*, which has so long held supremacy as the eastern port, destined to be supplanted by *Tampico*, the open coral-reef waters, in ir exposure to the sudden and powerful north winds (*el Norte*), being suited for protracted anchorage.

STATISTICS.

	1879.	1900.
Area of Mexico in square miles	767,005	767,005
Population of Mexico	9,908,011	13,545,462
Density of population per square mile	13	18

Population of—	1870.	1900.	Population of—	1900
Mexico City	241,110	344,721	Guadalajara	101,208
Puebla	68,034	93,521	Monterey	62,266
Leon	—	58,420	San Luis Potosi	61,019

ANNUAL TRADE (*in pounds sterling*).

	Average 1871-75.	1881-85.	1891-95.
Imports	5,500,000	6,170,000	7,600,000
Exports	5,000,000	6,830,000	7,500,000

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BOOK V.:
CENTRAL AND SOUTH AMERICA

CHAPTER XLI.—CENTRAL AMERICA

By Dr. Carl Sapper,
Cobán.

Central America. The Central American republics—Guatemala, Salvador, Honduras, Nicaragua, Costa Rica—and the colony of British Honduras, occupy the greater part of the land bridge between the North and the South American continents. They are bounded

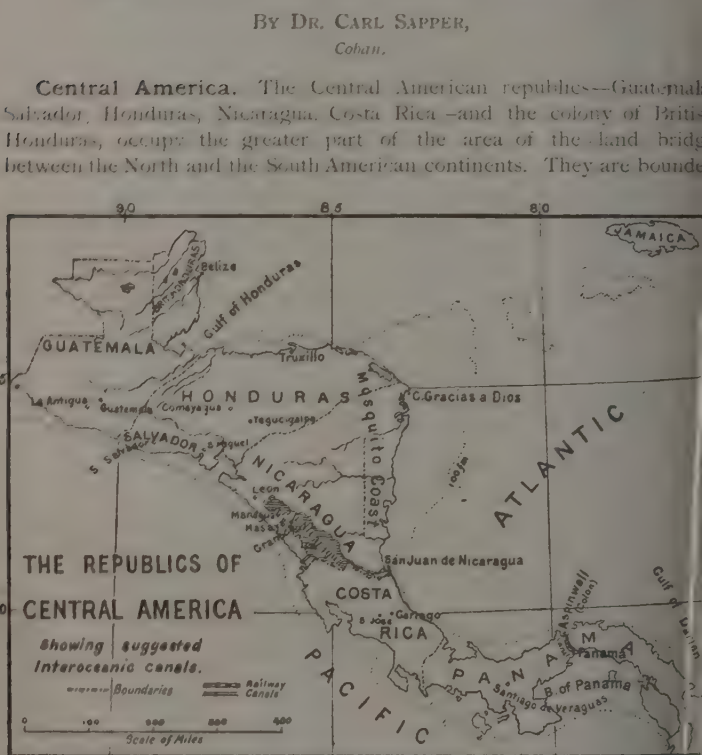

FIG. 371.—*Central America.*

on the north by the republic of Mexico, and on the south by the Colombian State of Panama, and lie between the Pacific Ocean and the Caribbean or Antillian Sea of the Atlantic. Both coasts are fairly uniform, forming only a few large bays, the Gulf of Honduras or Be

Amatique on the Caribbean, and the smaller gulfs of Fonseca, Nicoya, d Golfo Dulce on the Pacific side.

Orography and Geology.— Central America is very mountainous, greatest heights occurring among the mountains of Guatemala and sta Rica, while the ranges between them are only of moderate elevation. e beautiful cones of numerous volcanoes rise in a long, broken row ar the Pacific coast; only where the land narrows in Costa Rica do y stretch across to the Atlantic side. The soft volcanic ashes which re accumulated are of great importance, forming plains in the mountain gion, and, together with river deposits, along the coasts, where they terially increase the fertility of the soil. In the neighbourhood of the canic belt earthquakes are common and sometimes very severe, as the quent destruction of towns testifies. Amongst the specially memorable astrophes are those of Guatemala in 1773 and 1902, of San Salvador in 54 and 1873, of Jucuapa (Salvador) in 1878, of Cartago (Costa Rica) in 41 and 1851, of Rivas (Nicaragua) in 1844, and of Leon (Nicaragua) in 09. Earthquakes are rarer and less severe in the non-volcanic districts d least frequent on the Atlantic coast. They are very rarely felt in itish Honduras.

Surface of Guatemala. In the northern republic of Guatemala is easy to distinguish three orographic zones, the northern hilly ain of Peten, merging into the southern hilly district and northern ain of British Honduras; then the mountain chain of Central atemala, which attains heights of 12,500 feet, and the massive ge of South Guatemala, which reaches 11,000 feet in Cerro Cotzic, d is continued towards the east into Honduras and Salvador. the southern ridge of the last-named range numerous volcanoes e, the highest, as determined by the triangulations of the inter ntinental railway commission in 1892, are Tajumulco, 13,814 feet, cana, 13,334 feet, and Acatenango, 12,992 feet. The Pacific coast plain tches at the foot of the volcanoes. The plain of Peten is composed the most part of horizontally stratified recent Tertiary limestones. e northern chain of the Central Guatemala system, which appears to e been upheaved in middle Tertiary times, is composed of strongly led and up-tilted early Tertiary and Mesozoic strata including an Upper taceous limestone, which plays a large part. The middle chain is esozoic, including schists and Carboniferous limestones, and both chains broken through by the transverse valley of the Rio Chixoy. The thern chain (Sierra de Las Minas and Del Mico) is of Archaean formation, ncipally mica-schist. Outbursts of granite, diorite, and serpentine ce these ancient rocks. The cordillera in southern Guatemala is built f recent eruptive rocks, partly andesite and partly basalt. Most of the anoes of Guatemala are extinct; during historic times eruptions have, ever, been recorded of Tacana, Cerro Quemado, Fuego and Pacaya.

Surface of Salvador.— In the republic of Salvador the mountain

chains of recent eruptive rocks rarely exceed 5,000 feet in height, a
are broken through by the transverse valley of the Rio Lempa. Stee
sided spurs of the Honduras Mountains in the north are separated fro
one another by deep-cut river valleys. The Pacific coast plain is rath
narrow, and the main mountain ridge behind it contains most of t
volcanoes, none of which reach 8,000 feet. During historical times t
volcanoes Santa Ana, Quezaltepeque, San Miguel, Conchagua, a
Conchaguita, have been active ; Izalco was formed in 1793 and has sin
been continually in eruption ; on the other hand, a new volcano whi
appeared in Lake Ilopango in 1880, has since nearly disappeared. T
mountains of this republic have on the whole been little explored.

Surface of Honduras.—In the south of Honduras the mountai
of recent eruptive rock are separated into different groups by deepl
trenched valleys, and some considerable depressions of the crest.
northern Honduras the mountains present the appearance of a chai
although eruptive flows play a considerable part in their structure : quar
porphyry in the southern, Mesozoic and granite in the northern, cha
of Archæan rock. The latter reaches its greatest height in Congreh
Peak, 8,040 feet. The mountainous Bay Islands, Roatan, Utila, a
Bonaca are remnants of a former parallel chain. There are almost
volcanoes in Honduras except the extinct volcanic islands in the Gu
of Fonseca on the Pacific.

Surface of Nicaragua.—A great alluvial plain, similar to th
of British Honduras, stretches along the Atlantic coast of Nicaragu
and behind it the extensive highlands of Segovia, Matagalpa a
Chontales, composed of Palæozoic and Mesozoic strata with gran
and basalt intrusions, reaches a maximum height of 7,000 feet. Beyo
it there is a broad and remarkable depression occupied by the G
of Fonseca in the north, and further south by the great lakes
Managua and Nicaragua and the valley of their effluent, the San Ju
river. On the west this depression is bordered by the low mountai
of the coast cordillera. Numerous volcanoes rise from the volcan
ashes and tuffs with which the depression is covered, and many
them are active. Omotepe, on an island in Lake Nicaragua, is on
of these, and the eruption of Coseguina in 1835 is famous as one
the most tremendous and disastrous known to history.

Surface of Costa Rica.—Two parallel mountain ranges ru
through Costa Rica, separated by the depression of Cartago ; on th
northern range there are several active volcanoes, two of whic
Turrialba and Irazu, exceed 11,000 feet in height. The southern cha
has also numerous lofty mountains, but its highest peak (the volca
Chiriqui, 10,150 feet) lies beyond the southern border. The geologic
formations are similar to those of Nicaragua.

Hydrography.—The rivers of Central America flow partly to t
Atlantic Ocean and partly to the Pacific, but a few find their way i

es which have no outlet. The main watershed runs near the Pacific ast and thus the rivers entering the Atlantic are longer, and some of em are navigable in places for light-draught boats. It was proposed fore the United States took up the Panama Canal) to utilise the San n river flowing from Lake Nicaragua to the Caribbean Sea in the mation of a ship canal, to join the two oceans through the great lake. e Usumacinta and its chief tributaries, the Chixoy and Rio de la Pasion northern Guatemala are navigable, but rapids on the border of Mexican province of Tabasco interrupt communication with the . There are numerous lakes, chief amongst them the great Lake caragua, with an area of over 3,000 square miles, and Lake Managua, ich discharges into it. Lake Yzabal (Golfo Dulce) in Guatemala and numerous very beautiful mountain tarns and crater-lakes in most parts Central America are distinctive features. Lakes without outlet are mmon in the limestone region of northern Guatemala, the largest being ke Peten ; in the rainy season many shallow temporary lakes (*Akalches*) formed in the hollows of the same region. Numerous lagoons of ackish water occur along both coasts.

Climate.—Central America lying completely within the tropics in 8° 18° N., where the trade winds prevail, the climate would necessarily damp and hot were it not for the prominent mountain system, which luences both temperature and rainfall. While the mean annual tem- rature on the coast is about 80° F., in Quezaltenango, at an elevation of 00 feet, it is only 58°. The annual range is comparatively small ; the erage temperature of the coolest month, December or January, is only m 6° to 12° below that of the hottest month, April or May. The rection and extent of the mountain ranges exercise the principal luence on the atmospheric humidity and rainfall. Where the east or rth-east trades blow, the slopes facing the Atlantic are moister than se of the Pacific; on the latter coast only the southern slopes of the ghest elevations in Guatemala extract a heavy rainfall from the sea eezes. The driest regions are those which are protected by mountain nges from both oceans. All Central America is subject to numerous nderstorms during the summer rainy season (*Invierno*), which reach a ximum shortly after each solstice. On the Atlantic coast the summer rainy son passes gradually into the trade wind rains, characterised by a mini- m of thunderstorms but many rain showers of long duration, and leading a winter rainy season with moderate precipitation, from February to April. the Pacific slope a dry period (*Verano*) prevails from November to y. As an example of the influence of mountains on the distribution of nfall it may be mentioned that the annual fall at Tual on the northern e of the Central Guatemalan Chain (2,700 feet) is about 195 inches, in an on the top of the mountains (4,300 feet) 100 inches, and in Salama 50 feet) on the dry inland district of central Guatemala only 27 inches ; le in Guatemala city (4,850 feet) on the crest of the Southern

Cordillera the rainfall is 57 inches. The zone of maximum rainfall lie between 2,000 and 3,500 feet in elevation, above that precipitatio often assumes the form of mist, and at heights above 10,000 feet, of snow.

Flora and Fauna.—Corresponding to the climate, the moist Atlanti side of Central America is covered with luxuriant primeval forest, which i the interior is rich in valuable wood, including mahogany and logwood as well as in palms, creepers, and in the higher parts, tree-ferns, an epiphyte orchids. On the high mountains, oaks, alders, pines and cypresse are found. In the dry parts of the interior of the Pacific slope thin pin and oak woods cover the mountains, while the plains form grass savannas diversified by thorny bushes. The driest parts of all ar characterised by succulent plants such as the agave. On the Atlanti coast extensive deposits of sand are covered with grass and scattered pin trees, and known as Pine Ridges in British Honduras and on the Mosquit coast. According to the temperature there are three distinct floral zones (1) *Tierra Caliente*, or hot land up to 2,000 feet, the principal zone of caca cultivation, of the india-rubber and mahogany trees and of the coco-nu palm. (2) *Tierra Templada*, or temperate land from 2,000 to 6,000 feet containing the principal belt of coffee cultivation. (3) *Tierra Fria*, or col land above 6,000 feet, the principal grain and potato growing region Cultivation stops at 10,500 feet, and forests at 12,500.

Animal life is also richer and more varied in the moist than in the dr regions. The principal mammals of Central America are the jaguar, th cougar, and smaller felidæ, wild swine, deer, monkeys, squirrels, an opossums. Bird-life is particularly rich, and the most beautiful bird o Central America, perhaps of the whole Earth, is the quetzal, which i limited to the forests of the moist and cool region. Snakes, some of them very poisonous, abound in the moist and hot region. Alligators and turtle are found in the waters of the hot land, and everywhere insect life i superabundant.

People and History.—In contrast with the luxuriance of plant an animal life in the moist, warm region, the huma inhabitants flourish in the drier parts, where agr culture presents fewest difficulties and the condition of health are favourable. The hot forest districts a very thinly peopled or even uninhabited, while a con siderable density of population is found in the drie parts of the country. The prevalence of malaria i the low ground, both moist and dry, leads similarly to a concentration of population on the highlands which are free from malarial fevers. Human hab itations are found as high as 10,500 feet, but above that level the mounta n slopes are uninhabited. On the low, hot plains of Peten, in Guatemala there is only one person to two square miles, while in the high departme t of Totonicapan the density of population is 285 to the square mile.

FIG. 372.—*Average population of a square mile of Central America.*

The aboriginal inhabitants at the beginning of the sixteenth century re much more numerous than now, and were divided into many small es, always at war with one another. The only considerable kingdom that of the Quiché, which had already begun to decline when some of rebellious vassals of the Quiché king sought the aid of the Spaniards inst their sovereign. Craftily taking advantage of the disunion amongst Indian tribes Pedro de Alvarado, in 1524 and 1525, took possession of greater part of Guatemala and Salvador with a handful of Spaniards, se horses and firearms were objects of peculiar terror. Some years r the Verapaz district was peacefully brought under Spanish control ugh Fray Bartolome de las Casas, the famous historian of the Spanish quest of America. Costa Rica was occupied by the Spaniards from ama in 1522, and Honduras was taken in 1523. Cortez himself made extremely difficult campaign through northern Guatemala and into nduras in 1524–25. The agricultural native tribes of Guatemala, who e in possession of an old and highly developed culture and possessed anised government, were easily overcome in war, but so stubbornly they resist the introduction of new ideas and customs, that to the sent day a large number of them have remained free from intermixture l preserved their ancient language. The other Indian tribes, who tly resisted the Spaniards in arms, were gradually overcome or orbed, and thus it happens that over 880,000 aboriginal Indians now live Guatemala, while only 70,000 exist in the rest of Central America. The nber of Indian languages now spoken is about thirty, but most of the lians also speak Spanish. The majority of the population now consists Spanish-speaking Ladinos or Mestizos, *i.e.*, offspring of Europeans and lians. There are perhaps 30,000 Whites, Creoles and immigrants, and rger number of Negroes, Mulattoes, the offspring of Negroes and whites, l Zambos, the offspring of Negroes and Indians.

In the seventeenth century the Mosquito Indians, who lived on the east st, entered into friendly relations with the British Government, and by tish intervention the Indians of the Mosquito coast, which now forms t of Nicaragua, retain special privileges. Logwood cutters from aica settled on the coast of Yucatan in the seventeenth century, and colonists, by defeating a Spanish attack in 1798, definitely established colony of British Honduras. In the sixteenth century Central America l Chiapas formed one Spanish colony, the Captain-generalship of atemala, which became independent in 1823, when Chiapas was cluded in Mexico, and the rest formed the United States of Central erica. In 1839 they broke up into five separate republics, and empts at reunion, although frequently made, have hitherto come to thing. In 1896 Nicaragua, Honduras and Salvador formed themselves the Treaty of Ampala into the *Republica Mayor de Centroamerica*, with mmon representation in foreign countries, but the agreement did not ntinue. Although there is complete religious freedom in all the

Central American republics, by far the most of the people are Roman Catholics.

Productions and Trade.—As yet minerals are only worked extensively in Honduras and the north of Nicaragua, where gold and silver are mined. There is a little gold-washing and some lead mines in Guatemala, and lignite deposits are known in several places, although not worked. There is scarcely any manufacturing industry except the weaving of silk, wool and cotton on a small scale. *Altos* in Guatemala has woollen factories and a great annual market is held at *Esquipulas*, in the same republic. The export of mahogany and logwood, india-rubber and other forest products is considerable; Balsam of Peru is sent out from Salvador, and a certain amount of vanilla and sarsaparilla are also exported. Most of the people live by agriculture and the collection of forest produce, the nature of the cultivation depending on the climate, as each particular branch is concentrated in a special zone. Cattle-breeding is mainly carried on in the dry regions of the savannas and the scattered oak and pine woods, which form natural pastures. Honduras and Nicaragua are specially favourable for cattle-rearing, while the highlands in the high district of Guatemala are important for sheep. The cultivation of the cochineal insect was once important, but has now ceased. The cultivation of the soil is even more influenced by climatic conditions, although the most important crops, maize and beans, which form the staple food of the people, flourish in every climate and at all altitudes up to 10,000 feet. Other cultivated plants are confined to the warm, moist land, like cacao; to the warm, dry land, like indigo; or to the warm and temperate belt, like coffee, tobacco, sugar-cane, rice and cotton; while others are confined to the cold land, like grain, potatoes and apples. Some products are insufficient for home use; the cacao production barely suffices for the home demand and even flour must be imported from abroad. The only plantation product, except indigo from Salvador, which is exported in large quantities is coffee, which is of very fine quality, principally in Alta Verapaz and Costa Rica. Guatemala and Salvador have the largest coffee export, Costa Rica and Nicaragua produce about one-quarter as much, and in Honduras the export is only beginning.

Means of Communication.—The most important seaports of Central America are: in **Guatemala,** on the Pacific coast, the open roadsteads, *San José, Champereco* and *Ocós*, which carry on a large trade in coffee; and on the Atlantic, *Livingston* and *Puerto Barrios*, the latter a good natural harbour, but not well situated for trade. The chief harbours of **Salvador** are *Acajutea, Triumfo* and *La Union;* in **Honduras,** on the Atlantic coast, *Puerto Cortez;* and *Amapala* on the Pacific. **Nicaragua** has on the Atlantic side, *Bluefields* and *San Juan del Norte* (*Greytown*); on the Pacific, *Corinto* and *San Juan del Sur.* The harbours of **Costa Rica** are on the Atlantic side, *Puerto Limon;* on the Pacific coast, *Punta Arenas.* The means of communication in the interior are still

newhat undeveloped ; quite recently railways have been constructed or nned to the principal centres of coffee production, and lines joining the antic and the Pacific seaports are open or under construction in Costa ca, Honduras and Guatemala. Regular steamer communication is kept on a number of the lakes. The system of roads, on which goods are aveyed in two-wheeled ox-carts, is still very imperfect, and in the moun-nous parts of the interior only mules and other beasts of burden can be ployed. The Indians still continue to carry loads on their backs in oden vessels supported by a strap round their foreheads.

Political Divisions.—Central America is divided into six republics d one colony, the principal divisions and towns of which can merely be umerated.

Guatemala is divided into twenty-two departments. The capital, *atemala*, an inland town, is the seat of an archbishop, of a university d other educational establishments. The other important places are *ezaltenango*, *Antigua Guatemala*, which was formerly the chief town of ntral America, *Chiquimula*, and *Coban*.

Salvador is divided into fourteen departments; its capital, *San lvador*, is the seat of a bishop and of a university, and stands near its rt, *Libertad*. *S. Ana*, *S. Vicente* and *S. Miguel*, are the other towns.

Honduras is divided into fifteen departments, *Tegucigalpa* is the esent capital, but that rank was formerly held by *Comayagua*, which still the seat of a bishop ; both towns stand on the high plateau.

Nicaragua has thirteen departments. Its capital is *Managua*, on the e of the same name, but *Leon* is a larger town and the seat of a bishop. *anada* on Lake Nicaragua, *Masaya* and *Chinandega* are also large towns, d *Greytown*, at the mouth of the San Juan river, will become important en the projected Nicaragua Canal is carried out.

Costa Rica contains seven provinces. Its capital, *S. José de Costa Rica*, gh up on the mountains, is the seat of a bishop, and *Cartago*, the former pital, is also an important town.

Panama.—Formerly a province of Colombia. See p. 828.

British Honduras.[1]—The Crown colony of British Honduras, for-erly dependent on Jamaica, was given a separate organ-tion in 1884. It is divided from Mexico by the river ondo, and by the river Sarstoon from Guatemala in the uth. The western boundary is an arbitrary line. The ast is bordered by a maze of small islands and coral efs, rendering navigation difficult. The principal river the Belize, crossing the centre of the colony, and sepa-ing the hilly southern part, where the Cockscomb ountains reach 4,000 feet, from the flat northern por-n, a great part of which is occupied by swamps and lagoons, or shallow tes.

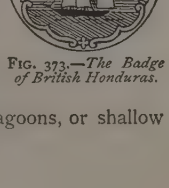

Fig. 373.—*The Badge of British Honduras.*

[1] By the Editor.

Practically the whole area is under forest, and forest products, whic attracted the "Baymen" in the seventeenth century, continue to be th staple exports of the colony. Mahogany and logwood trees are felled i the forests of the interior, and floated down to the coast, the quantity c the roughly hewn logs sent out each year largely depends on the amour of water in the rivers available for floating them. Coco-nuts and banan are largely grown for the American market.

The population contains only one per cent. of Europeans; but, for th tropics, British Honduras is considered not unhealthy, many of the white being descended from early immigrants. Besides the usual mixed race there are Caribs in the south, the remnant of those deported from th West Indies. *Belize*, the one town, is named after Wallace, an ol buccaneer. It has no harbour, steamers having to anchor a mile or mo from the river-mouth and work their cargo from lighters.

STATISTICS (*Approximate*).

	Area in sq. miles.	Population.	Density of pop. per sq. mile.	Largest Town.	Population.
Guatemala ..	42,400	1,365,000	32	Guatemala	65,000
Salvador.. ..	8,100	780,000	96	San Salvador	25,000
British Honduras	7,500	31,000	4	Belize	7,000
Honduras ..	46,300	382,000	8	Tegucigalpa	12,600
Nicaragua ..	47,800	313,000	7	Leon	34,000
Costa Rica ..	20,800	263,000	13	S. José	19,000
Central America	172,900	3,134,000	160		

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CHAPTER XLII.—THE WEST INDIES

I.—GENERAL FEATURES

By J. Rodway,
Georgetown, Demerara.

Position and Structure.—The West Indian Islands extend as a tural breakwater in front of the Caribbean Sea and Gulf of Mexico, m 27° N. off the coast of Florida to 10° N. near the shores of Venezuela. ey contain colonies of the Danes, French, Dutch, territories of the ited States, and independent republics, but the United Kingdom holds e greater number of the islands. The islands vary in size from Cuba,

Fig. 374.—*The West Indies.*

ich is one-third larger than Ireland, to tiny rocks and keys (or cays) just ing above the sea. They differ also in geological structure ; some pro- bly once formed part of the continent, some are composed of volcanic ck, others only of coral. Most of them have central ridges of mountains, d many signs of active volcanoes may be seen in the Caribbees, where ptions and earthquakes are still experienced at intervals. Taken as a ole the islands appear to form a great mountain chain, similar to the

Andes, but deeply submerged. Rushing mountain torrents are comm in all the islands; their gullies, at one time nothing more than beds sand and pebbles, are at another full and overflowing.

Rising from the deep blue sea, covered with rich green forests, a bathed in the splendour of tropical sunlight the rocky islands exceedingly beautiful. In sailing or steaming along from one to anot they look like ocean gems; here a mountain enwrapped in clouds, ther field of yellow-green canes, again a little town embosomed in precipices

Climate and Vegetation.—The climate is purely tropical. T sea-level temperature over the whole of the West Indies exceeds 80° F. the average from May to October, and in the cooler months rarely fa below 75° F., the annual range being very small. Rainfall and lo varieties of climate are dominated by the trade winds, which blow all t year round. From October to March the north-east trades blow strongl as summer advances they become rather weaker, and eddy, so as to bl from the east and south-east over the whole group, gradually returning a north-easterly direction about September. One consequence of t steady easterly winds is that the windward or eastward coasts of t Caribbees are beaten on by a continual surf, while the leeward or weste coasts have usually calm water, and deep, unsilted harbours. All t important towns of the Lesser Antilles lie on the west of the islands. T rainy season takes place towards the end of summer, October being t wettest month as a rule, and the dry season is at its height betwe December and April, when the northerly component predominates in t wind. From August to October hurricanes are frequently experienc The local climates vary considerably in the various islands. The Baham are cooler and more healthy than the Caribbees, and in Jamaica t inhabitants have the cool mountain slopes to which they can retire wh the coast is uncomfortably hot.

Most of the land is fertile, and in some islands particularly rich, althou in others, such as the Bahamas, it is almost barren. There are few w animals, but birds and insects are plentiful, while the flora is particula varied and interesting. All tropical fruits and vegetables can be grow but the staple has hitherto been sugar cane. Latterly the low price sugar consequent on the bounties given by European countries to e courage beet growing has reduced many of the West Indian islands to very low condition, a state of things intensified in some of the islands civil war and bad government.

People.—Since the discovery of the West Indies by Columbus in 14 the original inhabitants have almost entirely disappeared, leaving only few degenerate half-breed Caribs in St. Vincent. The great labo experiment of negro slavery was tried on a vast scale, and, whatever m have been the evils of that system, there is no doubt that it was success from an economic point of view. It has resulted in peopling the islan with a tropical race which seems well fitted to carry out their developm

d may perhaps some day make an impression on the world. Without negro these beautiful islands would possibly have been abandoned long , for since the emancipation of slaves the whites are becoming fewer d fewer every decade, except in Cuba and Porto Rico. Experiments ve been made in bringing labourers from India and China with good ults in Trinidad, but the general position of all the islands in 1899 may considered as almost stagnant. Yet they were of great value in the st, when they were "bones of contention" between the four great tions which fought for them, and with them the sovereignty of America. ain was put in the background by Holland, France, and the United ngdom, and, after many changes, the existing partition of the islands s brought about. The future of the West Indies is bound up with the ure of cane-sugar; other tropical products seem likely (1898) always to nain of secondary importance.

The islands are linked together by telegraph cables, which connect th North and South America. There are several lines of steamers run- ng regularly between the West Indies and Europe

II.—CUBA

By Robert T. Hill,
Geologist, U.S. Geological Survey.

Position and Coasts.—Cuba, the largest and richest of the West dian Islands, lies just within the tropics; its most northerly point within 100 miles of Key West, its most southerly within 100 miles of naica. The island is 720 miles long, and from 25 to 100 miles wide. area, including 1,300 keys ys) or islets, is 45,000 square les, of which 10 per cent. is ltivated, 4 per cent. forest-land, d the rest unreclaimed. Cuba s three natural divisions, the stern mountains, the central ins with occasional hills, and e western central axial moun- ns bordered by sloping valleys. cepting the swamp region, the and is thoroughly drained. The ast-line measures 2,000 miles; th embayments and islets it is er 6,800 miles. Except on the ith central side the coast is abrupt, and bordered by a narrow bench coral reef elevated 15 feet above the sea. The eastern coast, 600 feet gh, is rugged, with stair-like terraces. The land-locked harbours with rrow entrances are adapted for commerce and defence. The keys,

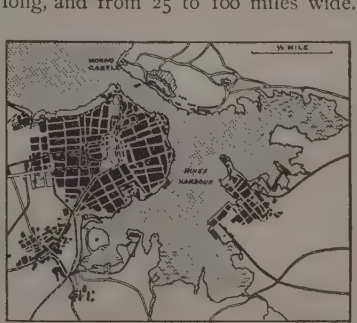

FIG 375.—*Havana Harbour—a typical natural harbour of Cuba.*

which border one half the coast, are coral or mangrove islets growing
from shallow platforms; lack of good water makes them uninhabitable.

Configuration.—The higher eminences in the interior are tr
mountains of deformation, composed of disturbed sedimentary rocks wi
igneous intrusions. They occur in three independent groups in the easter
western and central portions. The highest range, the Sierra Maestra, dom
nates both coasts of Santiago de Cuba. Its loftiest crest, Pico del Turquin
has an estimated height of 6,800 feet; its lower slopes are terrace
The central high mountains are less angular than the Sierra Maestr
and their summits (the highest, El Potrerillo, 2,900 feet) have radiati
slopes. They are composed of semi-crystalline limestones and shal
doubtfully considered Palæozoic, flanked by disturbed Cretaceous a
Tertiary beds. The Sierra de los Organos forms the island's axis west
Havana, and is an elongated ridge of various geological formations.
culminates in the Pan Guajaibon, altitude 2,532 feet. Low hills and mes
of circumdenudation capped by Tertiary limestone, 3,000 feet of whi
once enveloped the island, form an extensive plateau north of the Sier
Maestra, with terraced cliffs towards the sea; they include the Mesa To
and Junki de Baracoa, sometimes mistaken for craters. The upper ed
of this plateau is cut into knife-edged salients; the lower stair-like bench
are crossed by vertical canyons, through which the drainage finds outle
to the sea. In Matanzas and Havana provinces, the arch of the platea
whose crest on the northern side presents a cliff topography, descen
nearer sea-level, develops a longer but gentle slope toward the sou
coast, and ends in the Zapata Cienaga and the shallows between Cuba a
the Isle of Pines. The brackish swamp, Zapata, occupies 600 square mil
on the southern coast. The famous valleys of Cuba are either wide plai
threaded by rivers reaching the sea, or amphitheatres within the limesto
plateau.

The rivers are voluminous in proportion to their catchment areas. Th
streams run through widely sloping valleys; canyons are not develope
until the coastal rim of harder limestone at the entrance of the pouc
shaped harbours is reached. Many streams flowing southward disappear
vast swamps. In limestone formations the drainage is mostly subterranea
and beautiful caverns abound, the largest underlying the eastern Cuchill
There are also waterfalls, natural bridges, mineral springs, and baths, t
usual accompaniments of such karst phenomena.

Climate.—There are no extensive climatological records except f
Havana, and these do not apply throughout Cuba. Rains are mo
abundant from May to October; those brought by the trade-winds a
heaviest and most frequent on the higher eastern slopes. At Havana t
annual rainfall is about 52 inches, of which 32 inches fall in the wet seaso
The average number of rainy days in the year is 102. The air is usual
charged with 85 per cent. of moisture. Snow has only once been record
in Cuba, in 1856. At Havana the mean annual temperature is 77° F.;

and August the average is 82° F., fluctuating between 88° and 76°; the
est temperature recorded there during ten years was 100°. In
ember and January the thermometer averages 72° with a maximum
8° and a minimum of 50°; but on the interior elevations the freezing
t is reached in winter. The diurnal range of temperature averages 10°.
antiago the temperature is higher than on the northern and western
ts, and averages 80°, with a difference between the warmest and coldest
ths of 6° F. The easterly trade-wind prevails, but from November to
ruary cool north winds of short duration occur in western Cuba, where
a refreshing sea-breeze blows in the afternoon. The island is subject
urricanes.

Flora.—A voluptuous flora covers the surface and includes cha-
eristic forms of the West Indies, southern Florida, and the Central
erican seaboard. Many large trees of the Mexican Tierra Caliente
pear in western Cuba. Numerous palms, including the royal palm,
ır, and the pine tree is associated with palms and mahoganies in Pinar
Rio and the Isle of Pines; other woods are the lignum-vitae, the grana-
a, coco-wood, out of which reed instruments are made, and Cedrela
rata, used for cigar boxes and linings of cabinet work; fustic, logwood,
mahogany are largely exported from Santiago. There are still about
00,000 acres of uncleared forest. Nutritious grasses are found; the
e-apple, manioc, sweet potato, and Indian corn are indigenous. More
n 3,350 native plants have been catalogued.

Fauna.—The peculiar fauna includes only a few indigenous land
nmals. One rodent, the agouti, is as large as our domestic rabbit;
ther is the solenodon, whose family has other representatives only in
ti and Madagascar. There is a species of iguana, but there are no
sonous snakes. The crocodile, on the Isle of Pines, is the species which
urs in southern Florida, Jamaica and Central America. There are few
h-water fishes. A large lepidosteus, similar to the alligatorgar of the
thern United States, occurs. Insect life abounds, and there are many
chnids. Land molluscs with gorgeous colouring are found. Birds are
nerous, and the parrot is conspicuous; there is only one indigenous
nming bird. Collectively, the fauna proves the long isolation of Cuba
m continental lands.

History and People.—Beginning on the west, Cuba is divided into
provinces, Pinar del Rio, Havana, Matanzas, Santa Clara, Puerto
ncipe, and Santiago. A century before the Anglo-Saxon settlement of
New World, Spaniards colonised Cuba and built Baracoa, Santiago,
Havana. A search for gold yielded little return except the ornaments
the soon exterminated natives. Pastoral pursuits developed; the
igenous tobacco, and sugar-cane imported from the Canaries, were
tivated and African slavery introduced. Morro Punti and other
tresses were begun before 1600. The second century of occupation saw
reased agricultural development and colonisation, and fear of English

buccaneers and French and Dutch pirates resulted in the primitive for cations of the coastal cities. The wise administration of Las Casas and after influences held Cuba loyal to Spain, even during the times (1794–18 when the latter lost her mainland colonies and San Domingo. Spanish decree of 1825 gave the Captains-general despotic authority, en domestic peace, and initiated insurrections which only ended with the of Santiago in July, 1898. During the nineteenth century Spain m various pretences of extending Cuba's political privileges, but all lac the true essence of local self-government, and absolute power remai with the Spanish Captain-general. The Spanish government was devo to the enrichment of officials and to retaining Cuba as a colony. United States resolved in 1898 to put a stop to bad government in Cu and after a short war with Spain the island was taken under Ameri protection on January 1, 1899. A constitution was adopted in 1901, in 1902 Cuba became an independent republic. The people of Cuba for the most part descended from the early Spanish settlers, reinforced later immigrants from southern Europe, and affected in part by a c siderable infusion of negro blood. It is impossible to obtain accu statistics of the changes of population, because no reliable census taken for many decades. About 32 per cent. of the population are bl or coloured, using the latter word to mean a mixture of the black white races. The Spanish language is in universal use, and almost all people are Roman Catholics. There is a university at Havana, and th are now many schools.

Resources.—The products of the island are sugar-cane of a supe quality, tobacco, coffee, bananas, Indian corn, oranges and pines in order named. Cuba leads the world in sugar production, the amoun which in 1893–94 was 1,054,000 tons, all of which except 30,000 tons exported. During the revolution the production sank to one-third, bu 1900–01 it had risen again to 600,000 tons. The sugar lands are upl soils, and more fertile than those of the other West Indian islands; cane is planted only once in seven years; no fertilisers are used; estates possess recent inventions for the cultivation of the cane, extraction of its juices, and their conversion into the crystal. Thus su cultivation in Cuba has remained profitable in spite of the general dep sion in the cane-sugar trade.

Tobacco, while secondary to sugar, is far more profitable in propor to acreage. This product grows well throughout the island, but the c seat of its cultivation is the southern slopes of the Sierra de los Organos Pinar del Rio—the famous Vuelta Abajo region. Good tobaccos exported from *Trinidad*, *Cienfuegos* and *Santiago*. There are large c factories in *Havana*, and great exports of baled tobacco from eastern C are sent mostly to the United States. Coffee (introduced by the Fre from Martinique in 1727) was once extensively exported, but the trees h been replaced by sugar-cane or destroyed during revolutions. Bana

e been an important export in eastern Cuba. Delicious oranges grow rywhere. Pine-apples are exported from western Cuba and the Isle of es. Besides the large estates there are many small farms devoted to t growing, market gardening and dairy products.

On the fertile grazing lands of Santa Clara, Puerto Principe and tiago, fine animals of Spanish stock are produced. Horses are bred ughout Cuba. The developed mineral resources are iron ores, haltum, manganese, copper and salt. A little gold and silver were ed in past centuries. Iron ore has proved the chief metallic resource; Sierra Maestra mines produce mixed brown and red hematite, contain- from 65 to 68 per cent. of pure iron. They occur in the white estone that for 2,500 feet incrusts the seaward face of the por- ritic and granitoid core of the mountains. The production in 1890 was ,068 tons, amounting to one-fourth the total importation of iron ores the United States for the same period. Rich deposits of manganese ur in the Sierra Maestra range near Ponupo. Asphaltum of unusual ness is found near *Villa Clara*, beneath the waters of Cardenas Bay and eds of late Cretaceous and early Eocene age. Copper occurs at many es; from 1524 to 1867 it was mined at *Cobre*. Salt is made abundantly ng the northern keys. There are natural salt pans along the margin of o Romano, depressions twelve to sixteen inches deep, separated from sea by coral banks over which the waves wash in stormy weather. ys for brick and roofing tiles abound in the non-calcareous formations, ecially in the eastern provinces. The universal building material is estone and lime products, such as plaster and cement.

Communications.—The larger part of the thousand miles of public ways is comprised in the United System of Havana, which extends west east from Havana ough the tobacco and ar districts of the lta Arriba and Vuelta ajo and, within a day's rney, reaches the prin- al cities west of Cien- gos and Sagua la nde. The western minus is Pinar del Rio, miles from Havana; eastern terminus is Villa Clara, 150 miles distant. One line runs south n Havana to Batabano and meets the south-coast steamers. On sugar- ates narrow-gauge railways are freely used in handling cane; they mmunicate with the interior, in connection with coasting steamers and ad-gauge lines. Good highways are short and few; and even common ds for wheeled vehicles hardly exist, except near larger towns.

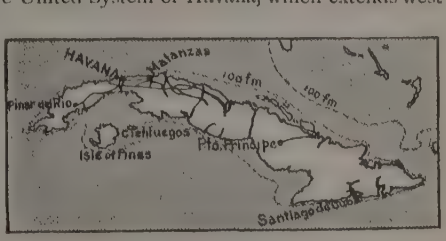

FIG. 376.—*The Railways of Cuba.*

Trade.—Most of Cuba is accessible to maritime transportation. The

chief harbours on the north coast are Bahia Honda, Cabanas, Hava
Matanzas, Sagua, Nuevitas, Gibara, Nipe, and Baracoa; and on the sou
Guantanamo, Santiago de Cuba, Manzanillo, Trinidad and Cienfuegos. T
shipping trade, both foreign and coastal, is extensive; steamers coast t
island, the north coast being served from Havana and the south fr
Batabano, the southern out-port of Havana. Although Cuba natura
commands the commerce of the American Mediterranean, trade a
communication with the adjacent regions, other than Mexico, have
hitherto been encouraged. The essentials of Cuban commerce are: (1
large balance of trade in favour of the island; (2) preponderating co
sumption of the exports by the United States; (3) the division of t
imports between other countries; and (4) the absence of trade with t
neighbouring regions—except the United States—of which the island
the natural commercial centre. The trade of the United States w
Cuba, which has recently been summarised by Mr. John Hyde, statistici
reached its high-water mark in 1892–93, when it amounted to £20,460,0
the ratio of imports, £15,741,000, to exports £4,721,000, being appro
mately as ten to three. In 1901 the total was £14,200,000, of which t
exports amounted to £5,300,000, showing a remarkable proportiona
increase.

STATISTICS (*approximate*).

Area of Cuba, in square miles	45,000
Population (1899)	1,572,845
Density of population per square mile	36

POPULATION OF CHIEF TOWNS, 1902.

Havana (Habana)	275,000	Matanzas	36,374
Santiago	43,090	Cienfuegos	30,038
Puerto Principe	25,102	Cardenas	21,940

There are no trustworthy trade statistics on account of the long period of political disturba
in the island.

III.—PORTO RICO

By Robert T. Hill,
Geologist, U.S. Geological Survey.

Position and Configuration.—The island of Porto Rico lies in t
same tropical latitude as Jamaica, and is separated from Cuba by t
island of Haiti. Although discovered by Columbus in 1493, and co
quered in 1508 by Ponce de Leon, it has never yet been systematica
explored. The island is 95 miles long, 35 miles wide, and has a coast-line
360 miles. It presents a picturesque hilly landscape. Central mounta
with broken slopes extend through its greatest length, and culminate
the Yunque of the Sierra Luquillo, 3,609 feet high. Remnants of t
virgin forests are still found on the sierra heights. The slopes are gen
rolling divides, succeeded towards the littoral by well-drained plains. T
undulating surface is adapted to pasture and the more ordinary kin
of cultivation, and is intersected by numerous perennial rivers.

According to Cleve, the Swedish naturalist, the northern hills are
ments of a thick series of limestone strata which have been cut
ugh by water. They have little inclination, and dip seaward from
axis of the island at a low angle. The mountain summits are covered
the Antillean Tertiary limestone, a formation which is usually hard
yellowish-white. In the mountains of the interior an older formation
conglomerates and metamorphic rock, similar to the older rocks of
aica, is visible below the limestones. The rocks of the littoral are pro-
ly elevated coral reefs. Great living reefs abound along the south coast.
numerous streams have contributed to the wealth of Porto Rico; some
navigable for small vessels, but have troublesome bars across their mouths.

Climate.—The mean monthly temperature hardly varies 6°, and the
eme limits observed are within 40° of each other. The hottest months
June, July, August and September; the coolest, December, January
February. The average daily temperature is 80° F., but a cooling
h breeze prevails during the hottest days. The thermometer averages
F. at noon, sinks to 81° at night, and sometimes falls to 61° F. The
lands are cooler, but snow never falls, and hail rarely. Disagreeable
l winds are unusual; but tropical hurricanes are frequent between July
October. The central mountains cause frequent showers on the
hern side, while the southern district remains without rain for months.
average annual rainfall for twenty-five years at San Juan is 54 inches,
at a station in the Yunque, 134 inches. The driest months are
uary and February, the wettest are October and November.

Resources.—According to Cleve, mercury is found in the Rio Grande,
gold in loose pieces in the Sierra Luquillo and Corozal rivers; placer
was mined by early Spanish settlers. Specular iron is reported,
bly on the Rio Cuyul, and magnetic iron ore from Gurabo and Ciales;
e of good quality, malachite and other ornamental or precious
erals occur.

Porto Rico contains many large trees; in the higher parts the forests
open, and largely without parasitic vegetation. The species include
ral palms, two tree ferns, cedar, ebony, sandal-wood and many trees
able for building purposes; while there are numerous medicinal plants
others used for condiments, dyes and tanning.

Agriculture is sufficiently diversified to produce food for the inhabitants
des large crops of sugar and coffee for export. The land is mainly
ded into small independent holdings belonging to the peasantry of the
rior. Small fruit farms are the most numerous, but there are many
ll and some large coffee estates, and a number of sugar estates, cattle
ns and some tobacco plantations.

The island contains no native mammals, except a single species of
uti, although introduced domestic species flourish. In the mountains
e are many birds; flamingos and other water-birds frequent the coast;
abound in the fresh water, and a gigantic tortoise is found.

People and Government.—Porto Rico for three centuries w only a penal station. The aborigines, of Arawak or Carib stock, w nearly exterminated in 1811 after an uprising against the Spanish. T present native people are of four classes: the Creoles, who c themselves Spaniards; the lower class of white peasantry, or Gibar the coloured people, or Mestizos; and the blacks. In 1615 a dec invited colonists to the island on most liberal terms. Lands were allot gratis; the settlers were free from direct taxes, and for a certain num of years from tithes, alcabala, and export duties, which then formed impolitic feature of the Spanish system. With this decree the prospe of Porto Rico began, and Spanish capitalists driven from San Domi and the Spanish Main about the same period, helped to develop resources. The negroes of Porto Rico are in a minority. When em cipation was given in 1873 industry survived, the planters continu their agricultural operations without financial ruin or social disorg sation.

For administrative purposes the island was divided into seven dep ments, including seventy villages. These departments, named after t chief towns, each contain about 100,000 inhabitants. Three small isla adjacent to Porto Rico constitute parts of its political organisation. Th are Mona on the west, and Culebra and Vieques on the east.

Porto Rico was assumed as United States territory at the close of Spanish-American war of 1898, when Cuba was taken under Ameri protection. The Catholic bishopric of Porto Rico was founded in 1 under Pope Julian II., and was the first established in the New Wo Instruction is divided into primary, secondary and superior. There eight superior schools for boys, four for girls, and many elementary cla and private schools, while in San Juan there is a college, with course medicine and law, and a normal school for both sexes. Eighty-seven cent. of the people are, however, illiterate.

Trade and Towns.—The industries are limited to the prepara of sugar and coffee for market, and the manufacture of tobacco, chocol wax, soap, matches, rum and straw hats; but there are a few foundries manufacturing iron machinery. The productions for export are su cane, coffee, tobacco, cacao and cotton. Sugar-cane on the lower slo and plains yields about 6,000 pounds to the acre. A peculiar variet upland rice, together with yuachia and plantains, are staple foods of labourers; bananas, maize, beans, yams, sweet potatoes, mangoes, p apples and other fruits are also of importance.

The larger commercial towns, mostly seaports, are: *San Juan, Po Mayaguez, Aguadilla, Arecibo, Fajardo, Naguabo, Arroyo,* and *San Germ* The principal ports are San Juan on the north; Fajardo and Enshl Honda on the east; Ponce and Guanica on the south; and Puerto de Cabo Rojo on the west. Playa is the best port.

The island has communication by steamer with Europe, the o

nds of the West Indies, and the two neighbouring continents; two s of steamers circumnavigate it, stopping at the various ports. There about 150 miles of railroad in operation, and as much under con- ction.

STATISTICS.

rea of Porto Rico in square miles	3,668
Population of Porto Rico in 1899	953,243
Density of population per square mile	260
Population of Ponce	27,952
„ San Juan	32,048

COMPOSITION OF THE POPULATION.

White.	Coloured.	Negro.	Total.
89,426	304,352	59,390	953,243

IV.—HAÏTI AND SANTO DOMINGO

By J. Rodway,

Georgetown, Demerara.

Physical Features of Haïti.—The island of Santo Domingo, better wn by its old Carib name of *Haïti* (rough land), or by the name *Ispaniola* bestowed on it by Columbus in 1492, is separated from Cuba he Windward Passage, and from Porto Rico by the Mona Passage, n much frequented by vessels entering the Caribbean Sea. The ine of the coast is remarkable, and the island is nearly as large as and, the length being about 400 miles and the greatest breadth 160. r chains of mountains corrugate its surface, running nearly parallel to n other, separated by depressions, and all trending nearly east and t. The Monti Cristi range, parallel to the north coast, is succeeded he great Cibao Chain, which forms the north-western peninsula and s to the extreme east end of the island; it bears the highest summit in West Indies, Loma Tina (10,300 feet). Between these ranges lies the ad plain called by Columbus *Vega real* or the royal garden, a region of at fertility, traversed by large rivers. The southern range forms the th-western or Tiburon peninsula, and runs along the western half he south coast. Gold, silver, copper and other minerals are found, le for the variety of its vegetable productions it is unexcelled by any of other islands.

History and People.—This magnificent island was the first to be nised by Spain, and horrible persecutions and massacres of the natives k place, which led to the entire extinction of the aborigines within about years. Haïti was then almost deserted for a time, save as a place of Plantations were neglected; cattle, hogs and dogs ran wild and reased to a wonderful degree, until the French buccaneers settled in e of the western bays, and especially on the small island of Tortuga. ey lived by hunting the wild cattle and by piracy, until gradually taking

possession of a great portion of Hispaniola, about one-third of the isl was ultimately ceded to France by treaty in 1697. From that period portion now known as Haïti became the most flourishing colony in West Indies, until by the blunders of the first French Republic and t of Napoleon I. it was entirely lost. The Republic declared the right man and freed the slaves; Napoleon, on the petition of the wh rescinded this resolution, and ordered the negroes back into slavery. result was a series of massacres, ending in the erection of a negro repu where no white man could hold any real property. Since 1810 there h been negro emperors, kings, and presidents, Haïti has been joined Santo Domingo, which proclaimed its independence in 1821, and ag separated, and the whole island has been almost ruined. There however, no reasons why it should not be very prosperous, save the w of good government and the virtual absence of white men.

The Republic of Santo Domingo.—The eastern republic Santo Domingo is divided into six provinces and six maritime distri and is governed by a President and a Congress of twenty-four memb who are elected for two years. The exports are coffee, timber, toba cacao and sugar. The capital is the old Spanish city of *San Domingo* the south-east coast, and there is a port on the north named *Puerto P* of about the same size. The Spanish language is universally spoken; the people are almost entirely negroes and half-breeds.

The Republic of Haïti.—The western portion of the island kn as Haïti is smaller in area, but of greater importance than its sister repub still retaining the superiority which existed while both were Europ colonies, and that due to its command of the great western gulf betw the two long mountainous peninsulas. The government is administe by a President, Senate, and House of Representatives, but it is gener considered to be rather that of a military despotism than of a repub The capital is *Port-au-Prince*, the towns of *Cape Haïtien*, and *Aux Cayes* also important. A patois derived from French is commonly spoken, pure French is the tongue of the better classes. There are but few whi and these labour under civil disabilities that may almost be compared w those formerly laid upon the coloured people under French rule. T exports are coffee, mahogany, logwood and cotton.

There are several islands off the coast; the largest is Gonave, 37 mi long by 9 wide, but on account of its being destitute of springs, i hardly habitable. There is also the old rendezvous of the buccanee Tortuga, which is 22 miles long by 8 broad, and La Saona, nearly large.

STATISTICS (*estimates about* 1890–91).

	Area sq. miles.	Popu-lation.	Density of Pop.	Imports £	Exports £	Capital.	Popu-lation.
Santo Domingo..	18,045	610,000	34	537,000	585,000	Santo Domingo..	15,000
Haïti	10,204	1,400,000	140	2,012,000	2,833,000	Port au Prince	50,000

V.—THE WEST INDIAN COLONIES

By J. Rodway,
Georgetown, Demerara.

THE BAHAMAS

ahamas.—The Bahama Islands are the most northerly of the West s, comprising about 3,000 low coral islets, rocks and banks. The e group is a British possession, and about twenty of the islands are ited. The most important are New Providence, Abaco, Harbour d, Eleuthera, Inagua, Mayaguana, Ragged Island, Rum Cay, and the nis, all of which are ports of entry. Besides these there are the Bahama, Crooked Island, Cat Island and Watling Island (San dor), Columbus's supposed landfall. Compared with the southern ls most of the Bahamas are little more than barren wastes, rising a few feet above sea-level, in some places so low that salt lagoons trate to great distances beyond the shore. The most conspicuous is the agave, from which sisal hemp is obtained as an article of nerce. Some of the islands are covered with its rosettes of spiny s almost to the exclusion of other weeds.

eople and Industries.—Three-fourths of the population are black bloured people; but the English language is the only one spoken. islands were originally taken possession of by the English at the first ement of Virginia, but for a long period they were little more than buring places for pirates. The early colonists suffered from the raids paniards and French, and in 1781 the islands were captured by the er, to be restored to Great Britain, however, at the peace of 1783.

he main industries are sponge-fishing and salt-raking; from natural s, where sea-water is continually flowing in and evaporating, the als of salt are raked into flat-bottomed punts and piled in heaps on hore until ready for removal. Coral, shells and turtle-shell are also ned by fishing and diving; fruit and early vegetables are grown for American market, and some of the islands yield guano. The capital only town of importance is *Nassau* on the island of New Providence.

JAMAICA

Position, Surface and Productions.—About 100 miles west of i, and 100 miles south of Cuba comes Jamaica, the largest of the sh West Indies. From east to west its greatest length is about 150 s, and its breadth from north to south 50 miles. A range of mountains through the axis of the island from east to west with numerous ecting spurs; the highest peak of the Blue Mountains rises to 7,400 Numerous small rivers flow from both sides of this range, but none navigable. The name "Jamaica" comes from a native word meaning

"land of springs." The climate differs according to altitude, that of lower levels being typically tropical, while the temperature on the hil lower according to the height. There are extensive forests, and the m tain streams are broken by numerous falls and catar All tropical productions can be grown to perfect and the exports are more varied than those of other British West Indies. The sugar plantations, c so famous, have now dwindled to an area of only 26 acres, and although other products have been lar increased by the introduction of banana and or planting for the American and British markets, island has never regained the prosperity which it on the emancipation of the slaves. Its chief exports are now bana oranges, sugar, rum, coffee, ginger, pimento, logwood and cacao.

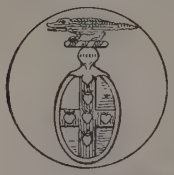

FIG. 377.—*The Badge of Jamaica.*

People, History and Government.—The population cons mainly of black and coloured people, the whites numbering only per cent. of the whole, and the proportion of East Indians is about the same. The island was first settled in 1509 by the Spaniards, and was conquered in 1655 by a British force sent out by Oliver Cromwell, since which time it has remained in the hands of Great Britain. Charles II. granted it a constitution in 1662, but in 1866 this was surrendered in favour of a Governor and Council, partly official and partly elective. The island is divided into three counties, Cornwall in the west, Middlesex in the centre, and Surrey in the east; these are subdivided into parishes the unit of local government being the Paroc Board.

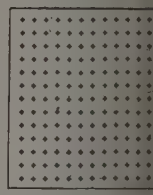

FIG. 378.—*Average ulation of a sq mile of Jamaica.*

Resources and Towns.—There are few industries beyond the rai of agricultural produce. Jamaica rum has long been famous through the world, and is unique in flavour. Jamaica coffee and ginger are well known, while pimento is obtained almost exclusively from this isl Attempts have been made to introduce tobacco growing and cigar mak but hitherto with only moderate success. The capital is *Kingston*, wh is well situated on a good harbour in the south-east of the island. town was practically destroyed in 1907 by an earthquake, similar to which submerged the greater part of the town of Port Royal on the opp side of the harbour in 1692. The seat of government was formerly *Spa Town*, which lies a few miles inland. A railway extends from King to Montego Bay, in the north-west, 113 miles distant, another to *Ewa* on the mountains, and a third to *Port Antonio*, on the north-east c a distance of 54 miles. The roads in the island are fairly good, but li to injury by floods. From an economic point of view Jamaica is n behind Cuba and Porto Rico, but it may be safely predicted tha

estined to become prosperous in the near future as one of the fruit ens for the United States, and as a winter resort for North Americans.

Turks and Caicos Islands, the most southerly of the Bahamas, nder the jurisdiction of Jamaica. They consist of about twenty islands cays, forming two groups. The Turks Islands were so called from prevalence of the turk's-head cactus, which gives a character to the en soil. The most important of the group is Grand Turk, which is miles long by 2 wide. In South Caicos the small town, *Cockburn bour*, is a port of entry, and there is another port on Salt Cay. Most of black and coloured people are descended from the slaves of loyalist gees who left the southern States during the American War of pendence. Up to late years these people have been living a half ge life, but latterly, by the introduction of sponge-fishing, salt-raking the cultivation of sisal hemp, some progress has been made.

The Cayman Islands are also under the jurisdiction of Jamaica, which they are distant about 180 miles to the west. Grand Cayman miles long by 7 broad, in some places rock-bound, and in others ected by coral reefs. The Morant Cays and Pedro Cays are small ds with a few inhabitants engaged in turtling and collecting guano

DANISH WEST INDIES

Virgin Islands.—Immediately to the east of Porto Rico commences line of the Lesser Antilles or Caribbees, which form a perfect bow the convex part stretching into the Atlantic. The first group, going , is that of the Virgin Islands, rising from the extensive bank which east from Porto Rico. Thirty-two of them belong to Great Britain two to Denmark.

The Danish Islands are St. Thomas and St. John in the Virgin group, St. Croix. They were once under cultivation to a considerable extent, they are now almost bare, only covered with a scrubby vegetation isting mainly of lantana, or sage bush, amidst which the ruins of plantations here and there be discerned. But al-gh once largely supplied with plan-ns, their old prosperity was perhaps due to the fact that when the other ns ruling the West Indies were at war, mark remained strictly neutral. **St. mas,** with its commodious land-locked harbour, was a free port, as such it reaped to the full its remarkable advantages of position. es, privateers, men-of-war and merchant vessels of all nations within its harbour in peace and safety, and obtained supplies its traders. Of late years, however, St. Thomas has very much ned, and it is now little more than a port of call. The area of sland is 23 square miles, and its population 12,000, most of whom

FIG. 379.—*St. Thomas.*

live in the capital, *Charlotte Amalie*, which is also the capital of Danish West Indies. **St. John** has an area of 42 square miles, bu population of only 900. The island, in fact, is virtually ruined. **San Cruz** or St. Croix, is the largest of the Danish West Indies, with an a of 74 square miles. Once noted for its plantations, it has much diminish in the output of sugar, rum and molasses. The capital is *Christians* Very little Danish is spoken either here or at St. Thomas, English be generally used; the St. Thomas negro, however, is noted for havin smattering of several languages, which is a necessity from the island be the resort of so many nationalities. It has often been rumoured that United States were about to buy these islands.

DUTCH WEST INDIES

Dutch Antilles.—In the group south-east of the Virgin Islands the small Dutch possessions of Saba, St. Eustatius, and St. Martin's island half of which belongs to France). These are included under government with Curaçao, Buen Ayre, and Aruba, which are situated away, off the coast of Venezuela. The whole have an area of 400 squ miles and less than 50,000 inhabitants. **Saba** consists of a single volca cone rising 1,500 feet above the sea. Steps lead from the shore to a hei of 800 feet, where, within the ancient crater, the settlement has long b established. The inhabitants, who number nearly 2,000, grow fruit a vegetables, which they sell to other islands, and they are also expert bo builders and fishermen. In **St. Eustatius** also, the main part of the isl is a volcanic cone, but there is a stretch of fertile land on the lower slo It was once, like St. Thomas, a depôt for privateering and smuggl adventurers, but it has now entirely lost its former trade. **St. Martin's** been divided between France and Holland since the year 1648. Dutch portion is at the south of the island, and contains an area of square miles, with a population of nearly 4,000. A little sugar and salt exported, but the colony is by no means flourishing.

Dutch Leeward Islands.—The principal group of Dutch isla lies far within the bow of the Antilles and about 40 miles from the co of Venezuela. **Curaçao** is 36 miles long by 8 broad. Down to the of the last century it was the chief depôt of the smuggling trade w Spanish America, and was largely cultivated to supply fresh provisions the numerous traders calling there, but now it is much depressed. chief product is salt, but a little sugar and tobacco are grown, as wel the fruit used in flavouring the well-known liqueur named after the isla The small town of *Willemstadt* is the capital and the seat of governm for the whole of the Dutch West Indies. The administration is carr on by a Governor and Colonial Council, and each island has a chief, al whom are appointed by the sovereign. Willemstadt stands on a very s harbour, which can be easily secured from outside enemies. **Buen Ay** or Bonaire, and **Aruba** are smaller islands lying respectively to the e and to the west of Curaçao.

LEEWARD ISLANDS

British Leeward Islands.—This colony includes the **Virgin Islands** and the chain of British islands as far south as Dominica. It includes, amongst others of the Virgin Islands, Anegada, Virgin Gorda, Tortola, Van Dyke, Peter's Island and Salt Island, with an aggregate area of about 60 square miles. The chief town is *Road Town*, Tortola. A small quantity of sugar is grown, but the few inhabitants mostly live by growing provisions, raising cattle and fishing, their surplus produce being taken to St. Thomas. Antigua, with its dependencies Barbuda and Redonda, Dominica, Montserrat, St. Kitt's or St. Christopher's, Nevis, The Dogs, and several smaller islands, also belong to the "Leeward" colony. These islands were separated under one Governor and Legislative Council in 1871; and although so numerous, their total area is only 700 square miles. Structurally, they form the peaks of two parallel volcanic mountain chains, that to the west including Saba and St. Eustatius, St. Kitt's, Nevis, Redonda, and Montserrat, and that to the east Sombrero, Anguilla, St. Martin's, St. Barts or St. Bartholomew's, Barbuda, and Antigua.

FIG. 380.—*Badge of the Leeward Islands*

Antigua is 28 miles long by 20 broad; its coast is deeply indented and broken into bays and peninsulas with high and rocky shores, in contrast to the usual uniform outline of these islands. The whole island is beautifully diversified by hill and dale, and the highest elevation, the Shekerley Mountains, reaches 1,500. The chief productions are sugar, pine-apples, and there are many small estates in cultivation. Little more than one-twentieth of the population are whites. The island was settled by the British in 1632, and except for a short French occupation has since remained under the same flag. English is commonly spoken. The chief town is *St. John's*, well situated on English Harbour.

Barbuda and **Redonda** are dependencies of Antigua. Barbuda is very flat, with a large lagoon on its west side; its exports are salt and phosphates. Redonda is a narrow islet, only one mile long, but is valuable for its mines of phosphate of alumina, of which about 7,000 tons are annually exported.

Dominica, lying between the French islands of Guadeloupe and Martinique, is 29 miles long by 12 broad, with bold precipitous coasts and picturesque mountainous interior. The loftiest summit, Morne Diablotin, is 5,314 feet high, and from the mountains many rushing torrents descend, which vary much in size according to the rainfall. There are several hot sulphur springs. Good anchorage can be obtained to leeward, where are no harbours. *Roseau*, or *Charlotte Town*, is the capital; the other town is *Portsmouth*, or *Prince Rupert's Town*. The colony was settled by the French, and a patois of that language is most commonly spoken. The Grand Soufrière is an active volcano, and in 1880 there was

an eruption which covered the houses of Roseau with ashes and s to a depth of two or three inches. The chief exports are coffee, sugar and lime-juice.

Montserrat is 11 miles long by 7 broad. It is so rugged and tainous that only one-third of its small area can be cultivated, t mainder being covered with magnificent forests. The highest eleva the Soufrière Hill, 3,000 feet. *Plymouth*, the chief town, stands on ar roadstead on the south-west coast and near the fertile part of the i The chief product is sugar; lime-juice is also of some importan export. In 1896 a great hurricane, earthquake and flood devastat island. The English language is universally used, and the island is s be the most healthy of the Antilles.

St. Kitt's, or St. Christopher's, 23 miles long by 5 broad, taper the south-east to a long narrow peninsula, consists of a single peak, Misery, 3,700 feet high, with gentle slopes formed by old lava st deeply furrowed by the floods of the rainy seasons. The slopes ar fertile, and the alternating forests and cane fields produce a most pl effect. There are hot springs in several places which emit sulph vapours. This is the oldest British settlement in the West Indies, h been founded in 1623; but on account of an amicable arrangement division between the British and French, it was for a long time a "b contention" between the two nationalities. The chief town is *Bassete* the junction of the long peninsula with the main island. The chie ducts are sugar, molasses, and rum, arrowroot, coffee, cacao and toba

Nevis is joined to St. Kitt's for administrative purposes, and is separated naturally by a narrow strait. It is about eight miles in dia and consists of a single volcanic m tain rising from the sea to an ele of 3,200 feet, with fertile land o slopes. The only town is *Charle* and its products are sugar and s

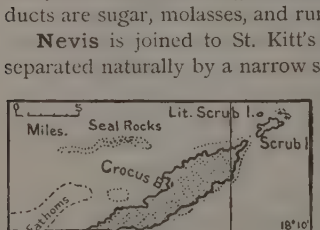

FIG. 381.—*Anguilla.*

Anguilla is also included i same administration. It is 16 miles by 3 broad, its name meaning having reference to its long narro curved form. Its exports are phos of lime and salt, and there is a town called *Rode Bay*. The small islands called The Dogs are depende of Anguilla.

FRENCH WEST INDIES

By M. Zimmermann.

The French West Indies.—The main group of the French Indies occupies the portion of the Lesser Antilles between 14½ and 16 it includes the islands of Martinique, Guadeloupe, Marie Galante

e of which only the two first are important; and there are also the f St. Martin and St. Bartholomew in 18° N. These are all that o France of its flourishing West Indian settlements of the seven- century. **Guadeloupe** is composed of a volcanic island, Grande nd a coral island, Basse Terre, united by a narrow isthmus, while **ique** is purely volcanic. Both are exposed to hurricanes and earth- and the eruption of Mont Pelée on Martinique in 1902 wiped out ort town of *St. Pierre* and destroyed 30,000 people. Both islands rgoing a serious economic crisis; their former sources of wealth, nd rum, have been unable to compete with the products of the he trade of Guadeloupe diminished by one-third between 1878 8, and Martinique is no better off. Efforts have been made to prosperity by the cultivation of cacao, tobacco, and especially pine- nd bananas. The population is very dense on both islands; the and mulattoes have entirely taken the place of the old planters.

WINDWARD ISLANDS

ish Windward Islands.—South of Martinique comes the n of the Windward Islands, which includes a, St. Vincent, Grenada, and the Grenadines. al area of these islands slightly exceeds 500 miles, and of their population less than five . are whites.

FIG. 382.—*Badge of the Windward Islands*

ucia is 24 miles long by 12 broad; it is of formation, very picturesque from the fantastic of the rocks. The soil is decomposed lava y fertile. A volcanic crater with a fuming is among the sights of the island. The scenery is of peculiar and Castries on the north-west, with its two peaks 3,000 feet high, he Pitons, can hardly be equalled in grandeur. The harbour of Castries is probably the finest in the West Indies, and has been adopted as a naval station. The people are mostly black and coloured, and speak a French patois similar to that of Dominica, but English is generally understood. The island was settled mainly by the French, but it was taken and given up again several times by the British before it finally came into their possession in 1803. *Castries*, on harbour, is the capital; the town of *Soufrière* lies on a less impor- in the north-west. The exports are sugar, cacao, logwood and spices.

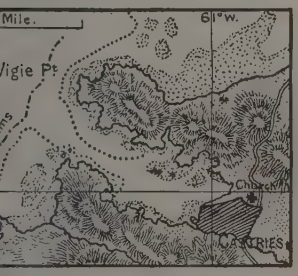

FIG. 383.—*Castries Harbour.*

St. Vincent is 18 miles long by 11 broad. A stretch of vol hills forms the backbone of the island, and extends here and ther spurs with rich valleys between them. The highest peak is the Mo Garou, 4,000 feet; the Soufrière, 3,000 feet, is an active volcano. In a most disastrous eruption took place, which utterly ruined the g part of the cultivation, and in 1902 eruptions did immense dar Between the two mountains there is a lake nearly a mile in diar occupying the crater of an extinct volcano, and without either in outflow. In early times the island was left in the hands of the Caribs was afterwards alternately French and British. The Caribs were, ever, so troublesome to the settlers that in 1796 the British authc deported them, to the number of 5,000, to the island of Rattan, off the of Honduras. The chief exports are sugar, rum, cacao, spices and arrov The capital, *Kingstown*, is situated on an extensive harbour in the south

The **Grenadines**, a line of small islands, extends between St. Vi and Grenada. Bequia belongs to St. Vincent, and is long and na with an area of six square miles; being badly watered, however not favourable to settlement. Carriacou, Union, and Mustique belo Grenada.

Grenada is 21 miles long and 12 broad, rugged and picturesq scenery, and traversed from north to south by an irregular mass of vol mountains, the highest, Mount St. Catherine, rising to 2,750 feet. island contains several small but picturesque crater lakes. The soi dark mould, very fertile, especially in the valleys. Unlike the other isl it has ceased to grow sugar, which has been replaced by cacao, v forms a valuable export, as well as coffee, kola and spices; the colon been called "The Spice Island of the West." Fruit and vegetable also grown for the markets of Barbados and Trinidad. Grenada ceded to Great Britain in 1783, after being in the hands of the Frenc over a century, and the Creole patois is commonly spoken. Of the p lation much less than one per cent. are whites. *St. George's*, the ca stands on a fine harbour in the south-west.

BARBADOS

Barbados, the most easterly of the West Indies, is 21 miles lor 14 broad, and lies 100 miles east of St. Vincent. It was partly fede with the Windward Islands until 1885, when it was entirely separ and is now a distinct colony. The island is lower than most o others, the highest elevation being only 1,145 feet. Surrounded by reefs, its formation is Tertiary sandstone and limestone, probably raise volcanic agency. A kind of bitumen called *manjak* is now being m and utilised, and a crude petroleum known as Barbados tar has long collected and used as a medicine. There are numerous springs, son which are impregnated with mineral substances, but no rivers. Th is so fertile and so free from rocks that there is very little waste la

e island. It was first settled by the British in 1625, and it enjoys the ique position of having never been in the possession of any other nation. e whites once preponderated, and by them Virginia and Jamaica were gely colonised. At present only about 10 per cent. of the inhabitants e white. The density of population, 1,120 per square mile, is perhaps ique for any separately governed colony or State. Barbados has never perienced the difficulty so conspicuous in the other colonies of want labour; even the emancipation caused but little distress. Sugar has ays been the staple product, and now that the price is so low the and is passing through a period of depression hardly known before. e English language is universally spoken, and the Barbadian is proud his connection with the mother country. His island is "Little gland," and he is "neither Carib nor Creole, but true Barbadian born." e constitution is old and on the lines of the mother country; the vernor represents the King, the Legislative Council the Lords, and e House of Assembly the Commons. *Bridgetown*, the capital, stands the shore of an open roadstead named Carlisle Bay, in the south-st, and a railway runs thence round the south and east of the island.

TRINIDAD

Trinidad is only separated from the continent by narrow straits, and ysically belongs to South America rather an to the West Indies, its mountains ing the continuation of the Venezuelan stem. Next to Jamaica it is the largest the British West Indian Islands, being miles long by 35 broad. It is generally el, but three chains of hills run across from east to west; that in the north, e termination of the Venezuelan Coast nge, is the highest, reaching a maxi-um of about 3,000 feet. The most re-markable feature is the Pitch Lake at La Brea, in the south-west, which was known from a very early period for even the buccaneers caulked their ships with its asphalt or bitumen. The lake covers about ninety acres, and its product is a valuable article of export, being largely used for pavements.

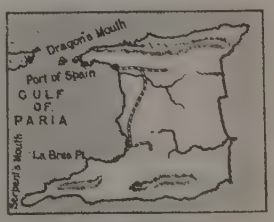

FIG. 384.—*Trinidad.*

G. 385.—*Badge of Trinidad.*

The climate is hot and damp, but agreeable, the soil fertile and capable of growing all tropical products. The forest, which covers a large part of island, is valuable for its timbers, and, like that of the neigh-uring mainland, is very interesting botanically. The island was covered by Columbus in 1498, and was colonised to a small extent by Spaniards, who continued to possess it till 1797, when it was con-

quered by Great Britain. Remnants of Spanish laws still exist, and t
Spanish language is spoken to some extent; but on account of a Frenc
immigration, which took place in 1783 and following years, the Creo
French patois is more prevalent. English is, however, generally unde
stood. Together with the island of Tobago it forms a Crown colony;

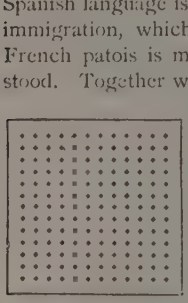

FIG. 386.—*Average population of a square mile of Trinidad.*

is administered by a Governor, Executive Counc
and Legislative Council. The inhabitants consist
black and coloured people, with a small proportio
of whites, East Indians who have been imported
labourers to the great benefit of the colony, and
few Chinese.

The chief products are sugar, cacao, and aspha
and, like the other sugar colonies, it is much d
pressed at present from the low price of its staple
less so than others, however, for Trinidad cacao is
exceedingly valuable product. There are about eigh
miles of railway open on the island connecting *Port of Spain*, the capital,
the north-west, with *San Fernando*, in the south-west, and with the interio

Tobago lies about 20 miles north-east of Trinidad, and is 26 mil
long by 7½ broad. Its formation is volcanic, with conical hills and ridg
rising to a height of 1,800 feet. It exports sugar, coco-nuts and live stoc
from the little town of *Scarborough*, on the south coast.

STATISTICS OF BRITISH WEST INDIES.

Colony.	Bahamas.	Jamaica and Turks Islands.	Leeward Islands.	Windward Islands.	Barbados.	Trinidad and Tobago.
Area, square miles ..	4,466 ..	4,372 ..	704 ..	509 ..	166 ..	1,868
Population, 1881 ..	43,521 ..	585,536 ..	122,046 ..	121,502 ..	171,860 ..	171,179
„ 1891 ..	47,565 ..	644,235 ..	127,723 ..	136,483 ..	182,306 ..	200,028
„ 1901 ..	54,358 ..	771,900 ..	127,440 ..	162,800 ..	195,600 ..	279,700
Density of pop. 1901	12 ..	177 ..	181 ..	320 ..	1,180 ..	150
Annual exports :—						
Average, 1871–75 ..	135,000 ..	1,364,000 ..	482,000 ..	539,000 ..	1,193,000 ..	1,613,000
„ 1881–85 ..	145,000 ..	1,445,000 ..	545,000 ..	508,000 ..	1,159,000 ..	2,503,000
„ 1891–95 ..	127,000 ..	1,896,000 ..	457,000 ..	515,000 ..	911,000 ..	2,157,000
Annual imports :—						
Average, 1871–75 ..	203,000 ..	1,654,000 ..	430,000 ..	419,000 ..	1,140,000 ..	1,381,000
„ 1881–85 ..	207,000 ..	1,500,000 ..	463,000 ..	407,000 ..	1,097,000 ..	2,566,000
„ 1891–95 ..	185,000 ..	2,094,000 ..	442,000 ..	446,000 ..	1,151,000 ..	2,195,000

PRINCIPAL TOWNS.

Town.	Colony.	Population, 1881.	Population, 189
Nassau	Bahamas ..	ca. 5,000 ..	ca. 5,000
Kingston	Jamaica ..	33,566 ..	48,504
St. John, Antigua ..	Leeward Islands ..	ca. 10,000 ..	9,738
St. George's, Grenada	Windward Islands ..	ca. 5,000 ..	ca 5,000
Bridgetown	Barbados ..	20,947 ..	21,000
Port of Spain	Trinidad ..	31,858 ..	33,273

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HAPTER XLIII.—THE CONTINENT OF SOUTH AMERICA

By A. J. Herbertson, M.A., Ph.D.

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Position and Outline.—South America is little less in area than orth America. Its seven million square miles form nearly one-seventh the land surface of the globe. The greater part of the continent lies ıth of the equator. The northern point, Punta Gallinas, lies in 12½° N. e latitude of Gambia), and the southern point, Cape Horn, in 56° S. rresponding to the position of Edinburgh in 56° N.). The extreme st point, Cape Branco, is in 35° W., and the extreme west point is Punta riña, which lies a little further west than 81° W., the continent as a ıole lying farther east than North America.

South America is almost surrounded by the ocean: by the Atlantic on e north and east, and by the Pacific on the west; and it is joined to ntral America only by the narrow isthmus of Panama, about 45 miles de. The continent as seen on a globe has a roughly triangular shape, thout notable peninsulas and with few islands; less than one per cent. the area is insular. In this respect it is even more compact than Africa. e South American coast line is not quite twice as long as the minimum e that could circumscribe its area, which is a greater proportion than ıt found in Africa. The fjords of the south-west are the chief source of e relatively more extended coast line of South America. Nevertheless, e coast line is only three-quarters as long as that of Europe, whose area ittle more than half as great.

Coasts.—The north coast borders the Caribbean Sea, which forms two lfs, that of Darien in the west, and that of Venezuela in the centre, the ter opening into the lagoon of Maracaibo. The water of this lagoon is sh in the south, but brackish in the north, where it is partly separated ım the sea by a bar from six to twelve feet below the surface. The ast here is low and sandy, but it is steep on the west coast of the lagoon, ere the mountains approach the sea. Curaçoa, Margarita, and other ands off the north coast are sometimes named the Leeward Islands, but ey must not be confused with the group of British West Indian ssessions so named. Trinidad lies as a detached part of the continent the eastern point of this northern coast, which trends south-east yond it. South of Trinidad the great delta of the Orinoco forms a flat ast, and this continues to be the nature of the Atlantic shores throughout

Guiana, which is bordered by a flat coastal plain. The coast south of
Amazon is broken only by the Gulfs of São Marcos and Bahia, bu
is bordered by a sandstone reef as far as 20° S. Beyond this, as far as
mouth of the Rio de La Plata, a series of lagoons run parallel to the sa
coast, except in the mountainous region between Cape Frio and Sant
which is of the Dalmatian type, and contains the magnificent harb
of Rio de Janeiro (Fig. 426). The Patagonian tableland forms a ste
though not lofty coast, with numerous gentle outcurves and incurves
which the bays Blanca, San Matias and San Jorge are the chief. T
Falkland Islands rise from the continental shelf to the east. South of 42
there is a fjord coast in the west, which is bordered by numerous islan
The great island of Tierra del Fuego is separated from the mainland b
series of fjords forming the Strait of Magellan (Fig. 405). Queen Ad'ela
Archipelago, Wellington Island, Chonos Archipelago, and Chiloe Isla
are the most important masses of land separated from the mainland by
western channels. North of this the coast is steep, with few breaks.
runs almost due north to 18° S., then north-west to Punta Pariña, no
of which comes the one large bay on this long coast line, the Gulf
Guayaquil.

Configuration—Chief Divisions.—The mean elevation of So
America, approximately 2,000 feet, is the same as that of North Amer
and of Africa. But the vertical distribution of
land differs in character from that of these t
continents. South America is distinguished
the large proportion of its area under 600 f
(42 per cent.), and also for the relatively lar
proportion over 10,000 feet (6 per cent.), which
only exceeded in Asia.

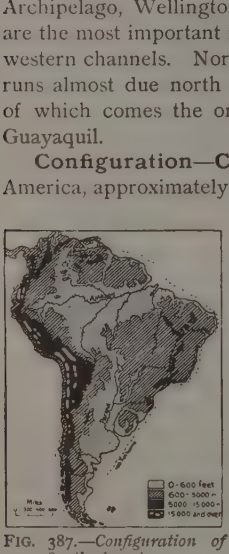

FIG. 387.—*Configuration of South America.*

Three elevated areas stand out clearly in t
structure of the continent: (1) The Weste
Cordillera; (2) the Guiana Highland; (3) t
Brazilian Highland. The flat Orinoco plain l
between the Cordillera and the Guiana Highlan
the great Amazon plain is bounded by all thre
and the Paraguay-Parana plain stretches from t
Cordillera to the Brazilian Highland and the s
The Guiana and Brazilian Highlands possess many similar characteristi
and may be viewed as one area—the Eastern Highlands—broken into t
parts by the Amazon Valley. There are thus three great natural regio
in the continent: The Eastern Highlands; the Central Lowlands; a
the Western Cordillera.

The Eastern Highlands.—The Eastern Highlands of So
America form one of the ancient land masses of the Earth's surface. Th
basis is of Archæan and old Palæozoic rocks, covered with sandstones, t
age of which is uncertain owing to the absence of fossils. They are not

rine origin, and are perhaps Palæozoic, perhaps Cretaceous in the north. ey are probably Cretaceous in the centre and south, but it is quite sible that some of the southern rocks may be of Triassic age. Too e is known about the geology of the interior to justify definite state- nts. In the south, coal-bearing layers lie over the Carboniferous or rmian conglomerate, and contain a *glossopteris* flora. This resembles a es of similar rocks, similarly situated in South Africa, India and Australia, l suggests the possible existence of ancient continental connections. rrow strips of Cretaceous and Tertiary rocks skirt the coast. In the stern Highlands no folding of the strata has occurred since Palæozoic es, and the faultings have produced the masses of table-shaped mountains, l erosion by running water the valley landscapes.

The Eastern Highlands vary from 1,000 to 3,000 or 4,000 feet in rage elevation, and are loftiest in the north and in the south, while the ıtre is a hollow, forming the lower valley of the Amazon. The zil Highland reaches nearly 8,500 feet near the tropic, where the average vation is between 4,000 and 5,000 feet. This loftier region is close to coast, and the long rivers therefore flow west like the Rio Grande and er streams running to the Parana, the São Francisco, the Paranahyba, l the Tocantins, and its great tributary the Araguaya. South of the pic the highland is lower and narrower. The Guiana Highland is highest he west, where the maximum height is supposed to be 11,000 feet in ıtu. The Branco, a tributary of the Rio Negro flowing southwards, l the Essequibo flowing northwards separate this higher region from lower land on the east. Here, as in Brazil, typical table mountains l terraces have been formed in the horizontally bedded rocks.

The Central Lowlands.—The Central Lowlands may be divided o two areas : the Patagonia-Pampa Area and the Area of Great River sins, the latter consisting of three regions ; the basins respectively of the Plata, the Amazon, and the Orinoco.

The Patagonia-Pampa Area consists of the low Patagonian plateau, and still lower Pampa region north of the Rio Colorado, the waters of ich do not reach the sea. Both are composed of a sandy clayey marl of rtiary age, recalling the *mollasse* of Switzerland, through which basalt ws have pierced, over which glacial waste has been spread, and loess wn, which in many places is weathered into loam. No foldings or fault- s occur in these strata, where Darwin found many remains of giant mmals. The pampa, however, is crossed by folded outliers of the stern Cordillera, composed mainly of ancient crystalline rocks.

The Great Basin Area occupies about two-thirds of the continent. The ee basins are not all of the same age, and each has its special charac- stics.

The La Plata lowland consists of a flood plain formed by the river vium covering the glacial morainic and inter-glacial loess and loam ch here and there are found on the surface. The rivers rise in the

higher regions surrounding this lowland. The Uruguay drains the lov part of the Brazilian highland, in the higher tropical regions of which Parana and its tributaries rise, the Paraguay flows from the Matto Gro heights, and its headwaters are only a mile or two removed from those tributaries of the Amazon, and three great rivers flow south-eastward fr the Bolivian plateau.

The main stream of the Amazon flows in alluvium of its own mould which is bordered by Tertiary layers, which may have been formed brackish water before the mighty stream extended its flood plain so far the east. The navigable Marañon and Ucayali from the Andes join Nauta, about 1,800 miles from the Atlantic, but only 370 feet above the level. The southern tributaries come from the Andes, the divide with Paraguay, or the Brazilian highland. They are themselves mighty riv with falls between 10° and 8° S., above and below which they are navigab The northern tributaries also have falls and rapids in their middle cou The main stream flows south of the equator, which it reaches only at mouth. The basin narrows in this region, and the river forms a gr estuary, up which powerful tidal bores rush. Although the Amazon is no means the longest river in the world, its basin is the largest, and water it conveys to the sea the greatest of any river, a fact easily explain by the heavy tropical rains which fall over most of the drainage area.

Very little is yet known about the geology of the Orinoco basin. T river rises in the loftier western region of Guiana. The upper waters the river divide, and part flows by the Cassiquiare south-west to the Negro, a tributary of the Amazon, while the rest sweeps in a curve round base of the Guiana highland, and forms a great delta. The river recei many tributaries from Guiana and also from the eastern ranges of Colombian and the southern slopes of the Venezuelan Cordillera.

The Western Cordillera or Andes.—The Andes, forming mountainous western portion of South America, run from south to no with increasing breadth as far as 18° S., and then curve almost in a se circle convex to the west, so that the northern ranges border the nor west of the continent. This semicircular belt is low and narrow in region where the Gulf of Guayaquil cuts into the coast; and at that point tectonic character of the mountains alters, allowing a distinction to drawn between the Main Cordillera south of 4° S. and the Northern C dillera north of that latitude.

The Main Cordillera of the Andes is comparatively simple as far no as Aconcagua, its highest summit (23,080 feet). A main range rises fr the plains in the east. A line of heights borders the Pacific, separated a great parallel longitudinal valley from the main range. In the sou where glaciation has been great, this valley becomes submerged, and represented by a series of sounds; in the north it is filled by rec geological deposits and forms the fertile valley of Chile. The glacia region south of 38° S. is cut up by many fjords which divide the west

ights into great islands and peninsulas. In the extreme south the mountns trend east and west. The southern Andes consist of granite with a band Cretaceous rocks in the east, and must be distinguished from the rest of the ain Cordillera north of 40° S. From 40° S. to 4° S. the western and eastern gions of the Cordillera differ both in composition and age. The eastern nges contain Archæan, Palæozoic, and petroleum-bearing Mesozoic rocks obably of Cretaceous age. The eastern ranges were folded earlier than the estern ranges, where the folds are more marked. Besides old crystalline cks the western ranges contain Jurassic and porphyritic rocks of similar e folded together. Both are remarkable, the Jurassic because they are the ly marine sediments of that age south of the equator, the porphyritic, so lled by Darwin, who first described them, because they are the only idence we possess of volcanic activity in Mesozoic times except in the lest Triassic strata. A series of young volcanic rocks comes between the stern and western regions; and along a line which clings to the eastern ot of the western or main range, there are numerous active volcanoes.

The western and eastern ranges include between them a plateau. he eastern ranges in the south have a more or less meridianal trend, but aces of them can be found in the Pampean ranges, in the mountains of rdoba, Tandil, and Ventana. In the north, on the other hand, they ike from north-west to south-east, and can be traced in the heights of Miguel west of the Paraguaya in 18° S. The Plateau can be divided into ree regions—the smaller or Argentine gion, part of the inland drainage area of e Pampa; the central or Bolivian plateau, intermont basin with its own drainage stem to Lake Titicaca; and the northern Peruvian region drained to the Amazon. was for a long time suspected that the ndes might be proved to attain their greatest height on the eastern le of Lake Titicaca, but the researches of Sir Martin Conway in 98 showed that this is not the case. The peaks of Mount Sorata ncohuma and Illampu) do not reach 22,000 feet, nor is that altitude rpassed by Illimani.

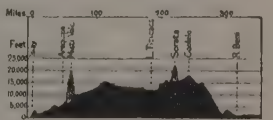

FIG. 388.—*Section across the Andes.*

The western range remains uniform in structure throughout its vast ngth, but the southern part lies parallel to the meridian, whereas the rthern part strikes from south-east to north-west, and disappears about 4° S. The Northern Cordillera begins at the point of disappearance of the in western cham. Here the marine Jurassic and the porphyritic cks are comparatively rare. The Palæozoic rocks of the eastern ranges are o absent in the north, where Archæan and Cretaceous rocks predominate. om Loja to the Knot of Pasto the Ecuadorian Andes form two chains, h many giant volcanoes, separated by a narrow but lofty plateau (Fig. 397). rth of Pasto the Cordillera is divided into four chains, with deep valleys ween, through which large rivers flow to the north and north-east.

The Eastern Colombian Range divides, and one branch flanks the Gulf Maracaibo, while the other runs eastward along the coast as the Caribbe or Venezuelan Range, whose continuation can be traced in Trinida Barbados, eastern Guadeloupe, Porto Rico, and Cuba.

Climate.—The greater part of South America has a tropical clima subtropical and temperate conditions occurring only in the south. T lofty western mountains divide the country into two very different clima areas, the west ruled by the Pacific, the east more dependent on t Atlantic. South America is distinguished from other continents by r having a marked con nental climate, for t term can be applied lor to the pampa region w of the Plata estuary; all seasons the isother in the west run on t whole from north-w to south-east. West the Cordilleras the te perature of the nor eastern region is alwa a little over or und 75° F., but the centre highest temperature f lows the Sun, and in t south-east the summer isotherms are convex to the south, while those winter follow the parallels of latitude.

FIG. 389.—*Isotherms of South America for January.*

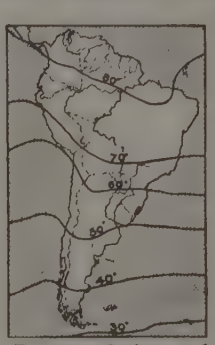

FIG. 390.—*Isotherms of South America for July.*

This distribution of temperature is explained by the study of the p vailing winds and ocean currents. Much of the west coast lies on the e side of the South Pacific subtropical high pressure area; all the win have a component directing them northwards, and the winds drive t surface waters in a northerly direction, and also cause an upwelling colder water from below. Hence the waters near the coast are relative cold, and the air is also relatively cool at all seasons. The extreme nor and south are not affected by this *régime*. The tropical regions are warm in the north in the northern summer and in the south in the southe summer. The centre of low pressure has a synchronous movement, a ocean winds penetrate to the heart of the continent in summer, and clou screen the land from the burning Sun. In winter the south-east of Sou America lies in the west of an anti-cyclone, and at all seasons the currer off most of the east coast flow from equatorial regions and are war The contrast between the climate on the east and west sides of a hi pressure area are well illustrated in South America.

The rainfall is also dominated by the conditions just described. In t anti-cyclonic areas of the west coast practically no rain falls, even althou

ie air is often saturated with water vapour near the coast, forming winter
ists. This is partly due to the rapidly rising
mperature gradient from the coast inland, when
ie humidity is low. North of 4° S. both tempera-
re and rainfall increase. In Guayaquil rain falls
om December to May, and round Buenaventura
ie scanty, and perhaps not quite trustworthy,
ecords show enormous precipitation almost every
onth of the year. The westerly storm winds
ring much rain to the western slopes of the
outhern mountains at all seasons, and the northern
nit of these storm rains sways north and south
ith the Sun. The south-east is dry all the year,
it north of the Plata estuary the summer rains
haracteristic of inter-tropical and sub-tropical
gions prevail. The equatorial double rainy
eason is not well marked in South America save in the equatorial mountainous regions. This resembles the Indian monsoon rains, and is due to the hot low pressure area formed round the southern tropic in summer causing an inflowing of winds from the north, which moisten the Guianas and the north of the Brazilian plateau; the dry period of inter-tropical South America occurs when the vertical midday Sun has moved southward from the northern tropic, but is still overhead at noon north of the equator. In the interior of the north-east of the Brazilian highland there is hardly any rain in winter. The lowlands north of 4° N. have less abundant rains than the other inter-tropical regions.

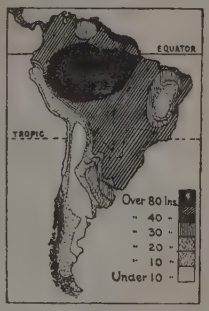

FIG. 391.—*Mean Annual Rainfall of South America.*

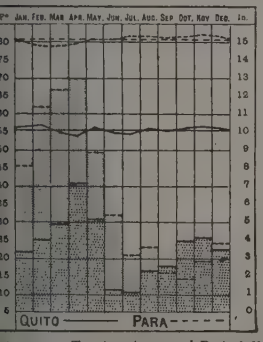

FIG. 392.—*Temperature and Rainfall of Tropical South America.*

The influence of the heavy rains on the
ncrease of the eroding powers of rivers is
eautifully illustrated in two regions. In
ie south-west the rivers have cut into the
ordillera until their valleys are so deep
iat they pass east of the main line of
eights and drain the eastern slopes. The
everse has occurred in equatorial regions,
here the rainfall is heaviest in the east,
id the upper waters of the Amazon and
s tributaries flow in the heart of the
ountains. The lowering and narrow-
g of the ridge near 4° S. is probably partly due to excessive erosion.

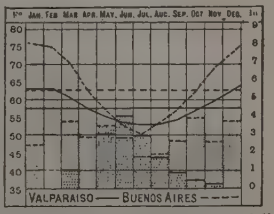

FIG. 393.—*Temperature and Rainfall of Temperate South America.*

Minerals and Soils.—South America abounds in minerals. The Guianas, the Eldorado of the early voyagers, are rich in gold; the Brazilian gold and diamonds developed in the schists, but usually found in conglomerates or rock waste, attracted early explorers. Iron, copper, lead, bismuth, antimony, and other metals, as well as precious stones, are sought for and obtained. The gold and silver mines of the Andes have yielded treasure for centuries, and are not yet exhausted. The Potosi mines alone have supplied over three hundred million pounds sterling worth of silver since the Spaniards first took possession of them.

Laterite covers most of Brazil and Guiana. The Orinoco and Amazon valleys consist largely of recent alluvium, which exists in the lowlands through which the other rivers pass. Patagonia is covered mainly with glacial waste, and loess and loam are found over the pampa and parts of the Plata basin, and even as far south as the Amazon. Much rough rock waste clings to the mountain sides, and along the young volcanic strip fertile volcanic soil is found. The dry western coast lands are covered with shifting sands, and in the south with loam. Salt deposits are common in the pampa and in the Atacama desert, whence nitrates are exported.

Flora.—The rainfall and vegetation maps of South America present many resemblances if the higher mountainous regions, which have a succession of floral regions running up to the snow-line, are excluded. The south-east Patagonian region covered with glacial waste is characterised by dwarf plants suited to the dry climate. This passes into a rich grass-steppe land in the north round the Plata estuary, and into a poor salt steppe inland nearer the foot of the Andes, in the drier districts where the extremes of temperature are at a maximum. The grass steppe of the pampa has woods along the water-courses, and the intermediate land covered with a thick carpet of grasses, composites, and papilionaceous plants. Further north trees are much more plentiful, and are largely evergreen, and once more we have to separate the moister, richer lands of the coast from the drier regions nearer the Andes, which forms the Gran Chaco, or "great hunting ground." This is a subtropical region where palms flourish. The maté or Paraguay tea (*Ilex paraguayensis*) is found in the eastern region; and the wax palm (*Copernica cerifera*) is typical of the whole Chaco. In eastern Brazil the savanna area is divided into a southern Campos region, where grasses often three or four feet high predominate, and a northern Catingas or "light woods" region, with a dry climate and thorny bushes. The Matto Grosso—the "great woods"—region belongs to the savanna area. The Beni region is probably also a savanna land with lower rainfall than the surrounding regions.

Most of the lowland of the basin of the Amazon is covered with dense tropical jungle—giant trees to whose tops strong lianas climb while round their base thick impenetrable underwood abounds. These Selvas, as the tropical forests are called, are the area of densest vegetation on the globe, and they persist owing to the abundant rains which fall most of the year

nd the never failing high temperature. Palms, mimosas, figs, bamboos re among the characteristic trees, over which bignoniaceous and other reepers twine, among whose branches epiphytes, including gorgeous rchids, flourish, while in the pools of water the Victoria regia spreads s great leaves and opens its gorgeous flowers.

North and west of the Orinoco, where the rainfall is scantier, are avannas, here called llanos, with tall grasses and isolated trees, many f them palms. Savannas also characterise the northern plains of olombia.

The rainy northern part of the west coast has dense tropical forests, the inless region is a desert, and temperate forests cover the hillsides watered y the rains accompanying the westerly storm-winds. Occasionally in the esert area scrubby olives, tamarinds, and mimosas are found, but in the tacama desert almost no vegetation exists, except here and there a miser- ble acacia bush. The temperate forest contains araucarias and conifers; ut there is a gradual change in the north to the desert conditions, and in ie south to the dwarf beech and other bushes of southern Patagonia and ierra del Fuego.

The Cordilleras contain many desert regions, here and there bush is ormed when the moisture suffices, in the north Stipa and other hard rasses form the Puna region. The eastern slopes over 5,000 feet (the *erra templada*), where rain is more abundant, have beautiful tree ferns, id the invaluable cinchona tree flourishes in the forests.

Quinine from the cinchona, cocaine from the coca, are among the iedicines obtained from South America. Maté and cacao, with their luable alkaloids, potatoes and tapioca, maize and tobacco, india-rubber id a variety of gums and wax, in addition to much valuable and beautiful mber mainly used by the cabinetmaker, are largely exported to Europe. he earth nut, Brazil nut, Spanish pepper, yams, batatas, and many other roducts of the forests and fields are abundant. Among the plants troduced within the last four centuries are rice, sugar, arrowroot, agave, otton, coffee and others that flourish in inter-tropical regions.

Fauna.—South America forms a separate faunal region with a charac- eristic series of animal forms, exhibiting different association of animals ith the different plant groups, forming a physiological rather than a orphological unity. The tamed llama and alpaca of the Chilean region re among the useful native animals of South America. At the time of the panish conquest dogs were used by the natives; and the Incas protected ie birds whose deposits formed the great guano wealth. Most of the her useful animals have been introduced. Horses flourish on llanos and ampa, cattle are found in the wetter, and sheep in the drier and colder gions of the southern grass lands, and pigs are plentiful, many of them lf wild.

People.—South America has, at a rough estimate, 37½ million inhabi- nts, giving a mean density of population of 53 per square mile. The

coastal lands, the river valleys, especially the alluvial plains of th Plata basin, are the most densely peopled. The inhabitants of the interio of the forest regions and in Patagonia consist mainly of aborigines, o many races differing in language more than in racial characteristics. Th natives of the warmer regions are yellower than the brown inhabitants o the mountains, but all possess the same dark, lank hair and scantiness o beard. The Caribs of the lower, the Nu-Aruak of the upper Amazon, th Tupi between the Amazon and Plata, and the Guaykuru of the Paraguay the Ges of eastern Brazil, and the Patagonians and Fuegians of the soutl are among the most important of their races east of the Andes. Th Araucanians of Chile, the old civilised Quichua, who formed the Inc State overthrown by the Spaniards, and the Chibcha of Colombia ar among the Andean tribes. The name Andes was itself derived from th tribe of the Antis. The inhabitants of the more densely peopled areas ar of European and African origin as well as American. Pure whites negroes, and yellow men exist, but the majority are of mixed race; s that here, as Reclus has pointed out, men containing the greatest numbe of characteristics of all races can be found, the most typical averag specimens of humanity.

History.—At the end of the fifteenth century the Chibcha of Colombia the Aymara and other Peruvian tribes, under the Incas of Cuzco, were i a relatively high state of civilisation, but could not resist the Spanish invaders, who had more difficulty in overcoming the Araucanians o Chile, a people who still form an important element of the population i the south-west. With these the Spaniards have mixed, and also in th Plata basin with the natives of the Gran Chaco and Verua. Whe Pope Alexander VI. divided the world between Spain and Portugal th latter received only the eastern tip of Brazil, but by the Treaty o Tordesillas in 1494 the boundary was moved westwards and passed fro the mouth of the Amazon due south. The Spanish conquered from th west, the Portuguese from the east. Here the Portuguese settled and soo introduced negroes from Africa to carry on the manual work. Slave continued to be imported for over three centuries, and a large blac element is found in the east from the Plata to Darien, but is mos numerous in Brazil and the Guianas. In this region the greatest miscegi nation has taken place; and the complications have been increased i British Guiana in recent years by the immigration of Hindu coolies. A steady stream of Italian emigrants seeks the east of South America, and British, German, and French settlers are found there and in the south-west

For three hundred years Spain was overlord of the continent outside Brazil and part of the Guianas; but in the first quarter of the nineteenth century the Spanish yoke was thrown off and various federal republics were formed on the model of the United States—an indirect outcome o the establishment of the Napoleonic Empire in Europe. In 1889 the Empire of Brazil also became a federal republic. Racial as well as

ersonal rivalries have had much to do with the state of recurring revolu-ion which characterises the Latin American republics.

Few of the national boundaries in South America were definitely fixed ntil about the close of the nineteenth century, and boundary disputes vere frequently the cause of revolution and war. Recently, however, nost of the acute frontier difficulties have been settled by arbitration.

The religion of the whole continent, save for a few unconverted avages, is Roman Catholic; the social and public life is derived from hat of Spain and Portugal.

THE COUNTRIES OF SOUTH AMERICA.

Country.	Area sq. miles.	Pop.	Country.	Area sq. miles.	Pop.
razil	3,210,000	14,332,000 (1890)	Ecuador	118,630	1,204,200 —
rgentina ..	1,130,000	4,894,000 (1900)	Paraguay ..	97,722	330,000 (1887)
olivia	515,130	2,520,000 (1893)	British Guiana ..	88,650	278,000 (1891)
olombia ..	513,850	3,320,500 —	Uruguay	72,170	793,000 (1893)
eru	439,000	2,629,600 (1876)	Dutch Guiana ..	46,000	70,500 (1892)
enezuela ..	594,000	2,323,500 (1891)	French Guiana ..	30,460	29,000 —
hile	290,820	2,903,700 —	Falkland Islands	6,500	2,000 (1901)

6 691 75

STANDARD BOOKS.

A. von Humboldt. "Travels to the Equinoctial Regions of the New Continent from 1799 to 1804." 3 or more vols.

J. Ball. "Notes of a Naturalist in South America." London, 1887.

W. Sievers. "Sud- und Mittel-Amerika." 2nd ed. Leipzig and Vienna, 1904.

E. Reclus. "Nouvelle Géographie Universelle." Vols. xviii. and xix. Paris, 1893–94. Also English translation.

Sir C. R. Markham and A. H. Keene. "Central and South America." Vol. I. "South America," in *Stanford's Compendium*. 1901.

P. Fountain. "The Mountains and Forests of South America." London, 1902.

CHAPTER XLIV.—THE ANDEAN COUNTRIES

I.—COLOMBIA

By Dr. Fritz Regel,[1]
Professor of Geography in the University of Würzburg.

Position, Extent and Coasts.—The Republic of Colombia occupies the north-west of South America, and its former department of Panama now a separate republic, gave it a share of Central America bordering on Costa Rica. It is bordered by the Caribbean Sea in the north and by the Pacific Ocean on the west. On the south its frontier is principally with Ecuador, except between 70° and 73° W. long., where the Marañon separates it from Peru. On the east from about 4° S. to 4° N. lat. it touches Brazil, and thence northward to the sea in 12° N., Colombia marches with Venezuela. The short frontier towards Costa Rica, and that towards Venezuela, determined in 1891 by Spanish arbitration, are the only boundaries as yet definitely fixed; on the other borders, Ecuador claims a broad strip on the south, Peru claims the south-east corner, and the Brazilian border is by no means definite. The small islands of the south coast of Panama also form part of Colombia.

Configuration.—The Isthmus of Panama is occupied by fairly high mountains, the Cordilleras of Chiriqui, of Veragua, and of San Blas, composed of crystalline schists and recent eruptive rocks; and they are only loosely connected through the Isthmus of Darien with the most westerly ranges of the Andean system. The South American portion of the country may be divided into the Andes region, and the great plains of the east.

The Andes Region contains four mountain chains: (1) The still almost unexplored coast-range or Cordillera del Chocó begins in latitude 4½° N. on the Gulf of Buena Ventura, and is defined on the east by the valleys of the Rio San Juan and Atrato. (2) The Western Cordillera the direct continuation of the western range of Ecuador, forms a long stretch of mountain wall, bearing the high summits of Cerro Munchique, 10,000 feet, and the Farrallones of Cali and Citará, 11,000 feet; further north near Paramillo (about 11,000 feet), the range breaks up into several spurs which sink to the low ground of Bolivar. The eastern border is marked by an inter-Andean depression, occupied in the south by the Rio Patia and in the north by the Cauca. (3) The Central Cordillera is the continuation of the inner or eastern Cordillera of Ecuador, and extends between the Cauca and the Magdalena valleys. The southern portion is characterised by lofty volcanoes built up of andesitic lavas, tuffs and ashes, including Pasto, 8,35

[1] Translated from the German by the Editor.

feet; Cumbél, 16,000 feet; the Sugar Loaf, 16,000 feet; Puracá, Huila, Tolima, 18,300 feet; Santa Isabél and Ruiz, whose broad snowy dome is the most northerly of the giant volcanoes of the Cordillera, and rises almost as high as the graceful cone of Tolima. The range, which is composed mainly of crystalline schists, sinks and broadens into the highlands of Antioquia, the northern spurs of which occupy the space between the Cauca, Neohi and Magdalena; although falling to the level of the northern plain, they are prolonged structurally to the snowy heights of the Sierra de Santa Marta on the coast. (4) The Eastern Cordillera, or Cordillera of Bogotá, adjoins the Cordillera of Ecuador as a separate mountain system in the south of Colombia, and bears almost the same relation to the Central and Western Cordilleras as the range of the Jura does to the Alps. It contains no volcanoes, and crystalline schists only appear in the north, the range as a whole being built up of strongly folded Cretaceous and Tertiary strata. Occasional plateaux, like that of Bogotá, are covered with more recent sediments. The Cordillera of Bogotá splits up towards the north, the western fork, called the Cordillera of Perijá, runs due north to the Sierra Nevada de Santa Marta; the central chain breaks off about 8° N. lat., while the eastern fork runs north-eastward into Venezuela. The highest part of the Eastern Cordillera of Colombia is the Sierra Nevada de Cocui, the summit of which exceeds 16,000 feet in height.

The great plains or llanos in the east of Colombia are covered by savannas in the north, the territories of Casanare and San Martin, while in the south in the territory of Caquetá, there are huge primeval forests or selvas. The soil is generally river alluvium, which conceals the Tertiary strata. The great rivers in the north, including the Meta and Guaviare, flow to the Orinoco, and further south to the Amazon, whose tributaries include the upper Rio Negro, the Caquetá or Yapurá, Putumayo or Iça, and, in the extreme south, the Napo.

Climate.—The climate corresponds generally to the purely tropical position of the country, but on account of the great elevations in the west, it presents many varieties. Four typical gradations of climate can be recognised in a vertical direction before coming to the region of perpetual snow on the summits of the two highest mountains. These are (1) the *Tierra Caliente*, or hot region, in the low ground of the northwest, the large river valleys, and the great plains of the east; this zone reaches to about 3,000 feet above sea-level, a mean annual temperature of from 83° to 75° F. prevails, and the products of the soil are purely tropical. (2) The *Tierra Templada*, or tempe-

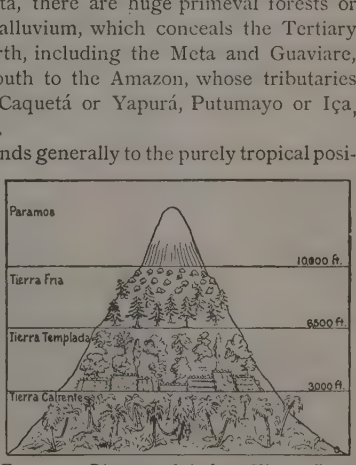

FIG. 394.—*Diagram of Andean Climate Zones.*

ate region, on the lower elevations, the foot-hills, and many of the upper river-valleys extends from about 3,000 to 6,500 feet; the mean temperature is from 75° to 65° F., and maize and coffee predominate as products. (3) The *Tierra Fria*, or cold region, on the high plains and in many mountain districts of the Cordillera, extends from 6,500 to 10,000 feet, with mean temperatures from 65° to 54° F. (Bogotá for example, at an elevation of about 8,200 feet has a mean temperature of 58° F.). Wheat, vegetables and northern fruits are cultivated in this zone. (4) The *Paramos*, the bleak, stormy, and almost uninhabited region of the mountains from 10,000 to over 13,000 feet, principally in the Eastern Cordillera, have a mean temperature from 54° to 43° F. Trees are often found near the lower limits of this zone, but the typical Paramos begin above the tree line.

The rainfall in the north and east, as far as the Guaviare, occurs mainly in two rainy seasons (April to June and September to December) separated by two dry seasons, in the north tropical rainfall district; while in the remaining districts one of the dry seasons (that in July) diminishes more and more, and the final result is that the year is divided into one extended rainy season (*Invierno*), and the principal dry season (*Verano*) in the equatorial rainfall region, where the primeval forest takes the place of the savannas in the plain.

Flora and Fauna.—Corresponding with the climatic zones and the complex conditions of the surface, the flora is unusually rich and varied; it bears, generally speaking, the character of the South American floral region. In the woods of the hot, low plain there is a great abundance of leafy trees and many varieties of palms; extensive bamboo thickets (*guaduas*) fill many of the river valleys, ivory nuts (*Phytelephas*) and dividivi wood (*Caesalpinia coriacea*), royal palms (*Oreodoxa regia*) and coco-nut palms are widespread. Other varieties of palm, together with many tree ferns, are found in the mountain forests, and higher up the cinchona tree. Lastly, in the misty region from 8,500 to 10,000 feet on the Quindiu Pass, there grow the lofty wax palm (*Ceroxylon andicola*); a few epiphytes, principally varieties of orchids, parasites, and ferns live on the high forest trees. On the Paramos there are beautiful flowering shrubs, innumerable "frailejons" (*Espeletia* and *Culcitium*) and certain grasses and similar plants which show many interesting adaptations to the rough mountain climate.

The fauna is typically South American with a number of Central American forms in the mountains. It includes amongst the mammalia, monkeys, the ounce and puma, tapir, capybary, the manatee in the Magdalena and Atrato rivers, the ant-eater, armadillo and opossum. The country is particularly rich in birds, amongst which humming birds, parrots and the toucan may be mentioned. Caymans, tortoises, very numerous lizards and snakes, toads of great size, particularly in the hot region, and many fish are found in the Atrato and Magdalena. Large spiders, scorpions, and centipedes are common, and the insect life is extraordinarily

in large and beautiful butterflies, innumerable ants, locusts, and hoppers, and such plagues of humanity as zancudos, mosquitos, fleas bugs.

eople and History.—Before the Spanish conquest, which took between 1536 and 1560, Colombia was inhabited by numerous Indian s, of whom the Chibchas inhabiting the eastern high plains, were allia e Quichuas of Peru. Besides the written sources of information, the rous discoveries in the Central and Western Cordillera of graves con- ng gold, stone and clay utensils, are of special importance. The sed Indians of the Eastern Cordillera, still form an important con- nt of the population in the east and south of Colombia. *Indios bravos*, s uncivilised tribes, are now found principally in the eastern plains, orthern mountains, particularly in Santandér and in the Sierra Nevada anta Marta (*Arhuacos*), in the Guajira peninsula (*Guajiros*), in the eval forests of the Cordilleras of Chocó, and to extent in western Antioquia. In the extreme the Indians closely approach to the Quichua The bulk of the present inhabitants are the ndants of the invading Spaniards, who mixed the Indians as well as with the negroes intro- d as slaves from Africa. A great part of the nal Indian population was killed out by perse- n. The negroes and mulattoes form a large on of the population of the hot region. The predominant language where is Spanish, and the religion Roman Catholic; with an arch- p in Bogotá and nine bishops.

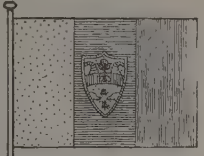

FIG. 395.—*The Colombian Flag.*

he Spaniards founded in 1547 the Captain-Generalship of New ada, which became a Vice-royalty in 1718. Independence from Spain secured between 1810 and 1819, when Bolivar united New Granada Venezuela, and in 1822 Ecuador was added to the union. This large blic of Colombia lasted only a few years; in 1829 Venezuela sepa- l, and in 1830 Ecuador followed its example. The constitution of country has frequently changed since 1831, when it was known as Republic of New Grenada; in 1857 its eight States formed the Grena- Confederation; in 1861 it was the United States of Colombia with States. In 1886 the present republic, with its capital at Bogotá, was ed, and in 1903 the province of Panama broke off under the guar- e of the United States. These provinces are Cundinamarca containing capital, Boyacá, Santandér, Magdalena in the north-east, Bolivar in north, Tolima and Antioquia in the centre, Cauca on the west, and ma; the formerly independent territories of the thinly-peopled rn plain are divided between Cauca and Cundinamarca. Each pro- has its own financial administration. The central government sts of a President, seven responsible Ministers, a Senate of twenty- members, each department being represented by three, and the

Chamber of Deputies, who number 68, one being elected for every 5 inhabitants.

Productions, Commerce and Towns.—As a rule the soil is vated only for the domestic supply, but recently the coffee plantatio Santandér and Antioquia have acquired some importance for export. principal plants grown in the hot region are sugar-cane, bananas cacao; maize, coffee and yucca in the temperate; and wheat, veget and fruit in the cool region. Tobacco is an important crop near Amba in Cundinamarca, and great herds of cattle are kept on the llanos, i Cauca district, and elsewhere. There is a certain amount of minin cluding gold, particularly in Antioquia, silver, copper, iron, salt and while emeralds of great value are found near Muzo in Santandér. Ind is as yet little developed and practically is confined to articles for home most necessaries of life have to be imported, including even flour. T is much hindered on account of the bad means of communica There are only about 250 miles of railway, and almost no roads, only tracks and footpaths with far too few good bridges. Education is neglected condition; the province of Antioquia is the best supplied schools. Progress has been greatly retarded by the frequency of civil and changes of government.

The population is principally concentrated on the mountains and plains of the Eastern and Central Cordilleras, and the upper Cauca b

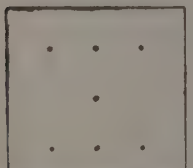

FIG. 396.—*Average population of a square mile of Colombia.*

and also, of course, in the seaports. The only town is the loftily situated *Bogotá*. The prin harbours are on the north coast; on the th peopled west coast *Panama* and *Buenaventura* alone of importance. The fine and strongly fort harbour of *Cartagena* formerly carried on a trade with the interior, but now the "Queen o Indies" is thrown into the shade by *Barranquill* the Magdalena, and its sea-harbour, Sabanilla, called *Puerto Colombia*. In 1890 two-thirds of imports passed through Barranquilla, and the Magdalena remains principal artery of trade, although its navigability leaves much t desired, and vessels ascend only as far as the neighbourhood of *H* The well-peopled western portion of Colombia is also reached b Cauca, the largest tributary of the Magdalena, and by the Atrato w flows into the Gulf of Urabá (Darien), and is navigable throughout al its whole length to *Murró*. The statistics of Colombia are very unsatisfac

In **Panama** the railway from *Colon* to *Panama*, about 45 miles lo important for transit trade from one ocean to another. A great canal desi to allow vessels to cross the isthmus was commenced in 1881 by a Fr company, but abandoned after immense financial loss. The work has been undertaken by the United States Government with every prospe success.

STATISTICS.

Province.	Area in sq. miles.	Population.	Density of Population per sq. mile.
Antioquia	23,790	465,000	20
Bolivar	27,040	945,250	9
Boyacá	33,320	517,000	16
Cauca (including Caquetá Ter.)	257,480	460,000	2
Cundinamarca (including San Martin Ter.)	79,700	537,500	7
Magdalena	26,950	137,500	5
Santander	16,290	432,000	27
Tolima	18,440	305,250	17
Colombia	482,010	3,099,500	6·5

Population of Bogota	120,000
" Medellin	40,000
" Barranquilla	40,000

ANNUAL TRADE (*in pounds sterling*) 1891–95.

Imports	2,500,000
Exports	3,400,000

REPUBLIC OF PANAMA.

Area, 31,570 sq. miles. Population, 340,000. Density of population, 11 per sq. mile.

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II.—ECUADOR

[By Sir Clements R. Markham, K.C.B., F.R.S.

osition.—The three republics of Ecuador, Peru and Bolivia, on the rn side of South America, occupy the territory which once com- d the empire of the Incas. The great chain of the Andes forms their one, and includes the principal part of all three countries. All three in vast forest-covered territory to the east of the Andes, and the two also include a coast region between the mountains and the Pacific n. The general configuration is the same, and they may be con- ed as one division of the continent, each divided into three very ct regions, the Andes, the Coast, and the Montaña or eastern forests. dor, as the name implies, is crossed by the equator, and it includes quatorial group of the Galapagos Islands in the Pacific.

he Andes of Ecuador.—The Andes form two chains of mountains, astern being composed of gneiss and schists, with some granite in the ; and the western of porphyritic rocks, diorite and greenstone. The s are connected by mountain knots which divide the plateau between into ten basins, much broken by spurs and ravines, but sometimes con- g plains of considerable extent. Their drainage generally finds its to the Pacific, but in four places rivers force their way through the

main eastern chain and join the Amazon. The great volcanic erupt
which form so prominent a feature of the Andes, have thrown up mag
cent peaks, and so overlaid the original formations by volcanic rocks
the earlier ranges are almost obliterated, except in the south. The lof
peak of Chimborazo, 20,498 feet above the sea, overlooks the coast reg
but, with this exception, the grandest snowy masses are on the eas
chain, including Cotopaxi (19,613 feet), Antisana (19,335 feet), and Caya
(19,186 feet). The
canoes of Cotopaxi,
garagua (16,690 feet)
Sangai (17,464) are
active, and are by far
loftiest active volca
in the world; while
incha, overhanging
city of Quito (15,918
has only been dor
since 1660. The ave
height of the Ande
Ecuador is 11,400 feet,
that of the habitable ba
between the ridges a
8,000 feet.

FIG. 397.—*The Andean Basins of Ecuador.*

The Andean Ba
—From the most nort
basin, that of Ib
streams flow westwar
form the Mira, the bo
ing river, in the
region, between Co
bia and Ecuador.
lake of San Pablo,
miles long in this basi
the only large lake in
Andes of Ecuador.
next basin to the s
that of Quito, is wat
by streams forming
river Guallabamba, a tributary of the Esmeraldas, which traverses
coast region and falls into the Pacific. The two basins of Latacunga
Riobamba are watered by streams uniting to form the Pastaza, which cr
the eastern chain through a narrow ravine, and, forming a sublime cata
dashes down a profound gorge into the Amazonian plain. Here the
some of the grandest scenery in the world. The rivers Caute and Zam
draining the basins of Cuenca and Loxa, also find their way through

n chain. A spur from the Western Cordillera runs parallel with the range for 60 miles, commencing to the north of Chimborazo, and a valley down which the river Chimbo flows southward, and unites he Chanchan coming from the Alausi basin, and both unite to join uayas. The Cañar (Naranjal) and Jubones basins send rivers of the names to the Gulf of Guayaquil, and the most southern Zaruma basin ined by the river Tumbez, which separates Peru from Ecuador on the

Other rivers flow from the outer slopes of the Andes, such as the nas and Doule to the Pacific coast, and the great river Napo on the rn slope of Cotopaxi.

he Coast Belt.—The Pacific Coast of Ecuador, which extends from . at the mouth of the Mira, to 3½° S. near the mouth of the Tumbez, nts two entirely different aspects. From the Mira river to a short ce south of the equator it is clothed with dense tropical vegetation, some of the reaches of the river Esmeraldas present scenes of ssing beauty. To the south vegetation is stunted and the coast nes barren. In the interior of the coast region, which is about 80 wide, up to the foot of the Andes, there are long spurs, and an ed chain of hills of Cretaceous formation. The great feature of the is the gulf of Guayaquil at the extreme south, with its large island of

The river system of Guayas converges to form a large estuary on rth side, and the vegetation again becomes rich. Along the shore of anal de Jambali, on the east side of the gulf, there is a very fertile ct famous for its cacao plantations, but the desert again commences e south side.

he Amazonian Slope.—The spurs from the Eastern Andes gradu- ubside into the vast forest-covered Amazonian plain which, within mits of Ecuador, is traversed by the rivers Napo, Pastaza, Santiago igre. The boundary with Peru in this direction is unsettled. Ecua- laims as far as the mouths of the rivers in the Amazon (Marañon), the Peruvians maintain that the courses of the rivers as far as they avigable belong to them.

limate and Vegetation.—The temperature on the low ground is igh, the annual average at Guayaquil being 82° F. On the Andean s the great height moderates the heat, the mean annual temperature at (over 9,000 feet) being 55½° F. (Fig. 392). There and on the western a hot, wet season lasts from December to May, with March as the st month. The eastern slopes are subject to the heavy rainfall brought s the Amazonian plain by the trade winds.

ie northern part of the coast region is covered with magnificent s, and here the Castilloa kind of india-rubber is found. On the of the Guayas system of rivers vegetation is also rich ; while on the rn slopes of the mountains there are great varieties of flowering s. This, too, is the home of the Red Bark tree, the richest in alkaloids the Cinchonæ. The eastern forests abound in graceful palms of

many kinds, enormous forest trees, many of them yielding valuable woo and in the forests of Loja are the famous trees of Cinchona officinalis Condaminea), the first species that was used for the cure of fever. the basins of the Andes, from their great elevation, the vegetatio scanty, chiefly consisting of Compositæ, and on sandy tracts the cactus the agave grow.

People and History.—The natives of the Andes of Ecuador of a race closely allied to the Inca Indians of P copper coloured, with long straight hair, no bea black eyes, and wide faces with large mou They are broad shouldered, with great power endurance as travellers, and strong as carri Owing to long ages of oppression they are me holy, phlegmatic and taciturn. In the eas forests there are numerous wandering tribes different race. Chief among them, in numbers

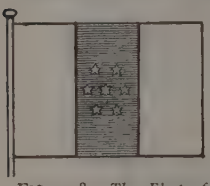

FIG. 398.—*The Flag of Ecuador.*

importance, are the Jeveros, a warlike, brave and astute people can tolerate no yoke; they are cultivators as well as hunters, and ra between the rivers Pastaza and Santiago. The Zaparos, in the basi the Napo, are less warlike and of different race, their physiogonomy b Mongolian; separate branches of the tribe are composed of fisher hunters and cultivators. Apart from the aboriginal Indians the pop tion consists of creoles of more or less pure Spanish descent, negr mulattoes, and mixed races who speak Spanish; but at least two-third the inhabitants of Ecuador are Indians, speaking the Quichua langu Almost all the inhabitants are of Roman Catholic faith, and educatio much neglected. Originally an independent people under their own "Scyris" or kings, they had their capital at Quito. These Indians were conquered in about 1450 A.D. by the Incas, who introduced large colonies from Peru and enforced the use of the Quichua language. In 1534 the Spaniards arrived in the country, and from 1564 Quito was governed by a President of the Court of Justice, under the Viceroy of Peru. In 1729 the Presidency of Quito was placed under the newly created Viceroyalty of New Granada, and so it continued until independence of Spain was secured the victory of Pichincha on May 22, 1822. For eight years it was par the great Republic of Colombia, but in 1830 it commenced a sepa existence under the name of the Republic of Ecuador, with its capit Quito.

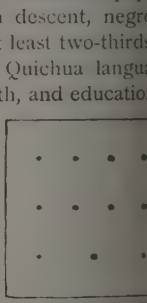

FIG. 399.—*Average ulation of a sq mile of Ecuador.*

Productions.—There are no manufactures of any consequen Panama hats being the chief manufactured export. Wheat and ba are grown in the Andean basins, but only sufficient for home consumpt cereals being imported from abroad for the use of Guayaquil and

Cattle are raised in some districts, and maize is largely used. are large cacao estates on the east side of the bay of Guayaquil n the banks of some of the tributaries of the Guayas, and some is also raised. The chief article of export is cacao, then follow na bark, sarsaparilla, Panama hats, india-rubber, coffee, hides and There are some gold workings in the basin of Zaruma, and there ormerly gold washings in the eastern streams, but minerals scarcely in the customs returns. There is steam and boat communication on ayas and its tributaries, and a railroad from Duran, opposite to quil, passes Chimbo, and is being extended towards Quito. The n the interior are merely tracks formed by the traffic.

visions and Towns.—The republic of Ecuador is divided into provinces in the Andes, corresponding with the basins already rated, and four on the coast. North of Quito are the two provinces chi and Imbabura, with capitals called *Tulcan* and *Ibarra*, both owns. *Quito* is in the province of Pichincha, at an elevation of over eet, and possesses the usual public buildings of a national capital. of Pichincha come the provinces of Leon with the town of *nga*, Tungaragua with the town of *Ambato*, and Chimborazo with *ba*. South of Chimborazo is the province of Bolivar, with *Guaranda* capital; and the province of Cañar, containing very interesting ins, has two towns, *Azoques* and *Cañar*. The three most southern es are Azuay, with the large and charmingly situated town of ; Loja, with the town of the same name; and Oro, where gold has been commenced round the little town of *Zaruma*. Each of dean towns occupies the central position in a lofty but habitable urrounded by mountains. The four coast provinces are Los Rios, e *Bodegas de Babahoyo* as capital; Guayas, with the great port of *uil*: Manabi, and Esmeraldas. Finally the Oriental province com- he vast forest-covered region to the eastward of the Andes.

great geographical interest attaching to Ecuador, the classic of Condamine and Humboldt, lies in the magnificent series of lofty nd extinct volcanoes. To the antiquary it is a region very inte- from the remains of a past indigenous civilisation. Rich in all ied products of the temperate and tropical zones, it is a country of cent future possibilities, but needing population for its development.

STATISTICS (*Estimates*).

a of Ecuador (square miles)	120,000
pulation of Ecuador	1,300,000
„ Guayaquil	50,000
„ Quito	40,000
„ Cuenca	25,000
„ Riobamba	12,000
ue of Exports in pounds sterling	1,400,000
„ Imports „ „	1,200,000

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III.—PERU

By Sir Clements R. Markham, K.C.B., F.R.S.

Coast Region.—Peru, like Ecuador, is divided into three well-m regions, the Coast, the Sierra, or region of the Andes, and the Montai tropical forest within the basin of the Amazon. The strip of land bet the Pacific and the Andes, averaging 20 miles in width, consists of a traversed at intervals by rivers. Its coast extends from 3½° to 18° S trends south-south-east and south-east from 81° W. at Point Pari 70° W. The absence of rain on the coast of Peru is caused by the a of the lofty wall of the Andes on the trades, wringing from those win last particle of moisture that a very low temperature can extract. winds consequently descend the western mountain slopes to the The constantly prevailing wind on the coast is from the south, and a ocean current flows from the same direction. From November to there is usually dryness on the coast, with a clear sky, but from Ju September the sky is obscured for weeks together by mist, whi often accompanied by drizzling rain. The wind never exceeds a g breeze all through the year. When it is hottest and driest o coast, it is raining heavily in the Andes, and the rivers are full. the rivers are at their lowest, the mists and drizzling rain preva the coast.

The surface of the deserts between the rivers is generally hard, but are often accumulations of drifting sand in the form of half-moon sh dunes called *medanos*, convex towards the trade winds. When the set in the low barren hills, near the coast, called *lomas*, are covered w blooming vegetation of wild flowers. In hollows which are reache moisture, the desert supports a few trees, such as the algaroba (*Pr horrida*). A striking contrast to the desert is afforded by the banks o rivers, rich with groups of palms, fine old willow trees, fruit gardens wide expanses of sugar-cane, cotton, or vineyards.

The Andean Region.—The Peruvian Andes increase in height north to south. The mountain system consists of three ranges. Maritime and Central Cordilleras, running parallel and near each oth the western side, are of identical origin, and on them are the volcano many thermal springs. But the great Eastern Cordillera, properly the Andes, is distinct. The narrow space between the maritime central chain is for the most part a cold and lofty tract known as the The Sierra is the much wider region between the central and ea chains, consisting of lofty spurs, wide plains, valleys and deep ra The Eastern Cordillera is a magnificent continuous range, in great p Silurian formation, with talcose and clay slates, and intrusions of gr rocks. It is cut through by six rivers in Peru, namely the Ma

laga, Mantaro, Apurimac, Vilcamayu and Paurcartambo, the four last tributaries of the Ucayali, a main affluent of the Amazon. The al Cordillera is not cut through by any river, although several sources ast streams are to the eastward of the line of highest peaks. It, how- forms an unbroken water parting. It consists of crystalline and nic rocks, with Jurassic strata, often thrown up almost vertically, on anks. The Maritime Cordillera is of the same formation, the two being merely separated by erosion. The habitable tracts within the illeras are from 5,000 to 12,500 feet above the sea; and the average t of the Puna and lofty ridges is from 12,500 to 14,500 feet; the rising to from 16,000 to 19,000 feet.

ivers of the Andes.—At the frontier of Ecuador the Maritime illera is of moderate height, but rises further south, and for 350 it forms the western side of the basin of the Marañon, which in the lake of Lauricocha, on the inner slope of the Central Cordil- The river forces its way through the eastern chain at the famous s called the Pongo de Manseriche. The Huallaga, following allel course between the Central and Eastern Cordilleras, forces its out at the Salta de Aguirre, and joins the Marañon. In this ern section of the Peruvian Andes the central chain attains a t of 20,000 feet. Here the river Santa rises in the alpine lake onococha at 10,000 feet, and flows northward down a gorge be- n the central and maritime chains for a hundred miles, then turns cuts through the mountains at a height of 9,000 feet, and reaches coast. This is the remarkable Callejon de Huaylas, analogous e valley of Chimbo in Ecuador. South of the sources of the two rivers Marañon and Huallaga, the mountain knot of Cerro de , in 10° 48′ S., unites the three cordilleras which to the south me loftier and more closely defined. From the knot of Cerro de to the knot of Vilcañota in 14° S. the Andean region is drained by ributaries of the Ucayali. The rivers sometimes cut profound gorges, enerally they form fertile valleys, with grassy mountain slopes. The e of the Apurimac, an affluent of the Ucayali, is the most distant from nouth of the Amazon, but the Marañon has the greatest volume, and ake of Lauricocha, where it rises, must, therefore, be acknowledged as ue source of the mightiest river in the world.

eyond the knot of Vilcañota is the basin of Lake Titicaca, which ds into Bolivia, and has a total area of 16,000 square miles. This is so lofty that the vegetation is scanty, the lake itself being 12,545 bove the sea. The northern part is drained to the lake by a number ers flowing over grassy plains, separated by low ranges.

he Amazonian Region.—The tropical forests of Peru, within the onian basin, are traversed by the great navigable rivers flowing from ndes, the Marañon, Huallaga, Ucayali, Yavari, and Madre de Dios. egion is naturally divided into two sections, the subtropical forests

in the ravines and on the slopes of the Andes, and the denser trop vegetation in the plains.

People and History.—The races of Peru are very distinct in three main divisions. The Inca Indians occupying the Andean regi and speaking the Quichua language, in 1876 made up 57 per cent. of whole population, and the half-castes 23 per cent. On the coast there once a race with a peculiar language and civilisation, but it is ne extinct, and the population now consists of negroes and Chinese. creoles of Spanish descent are chiefly in the cities of the coast, but are also established in the towns of the interior, and they all use Spanish language. The wild Indian tribes in eastern forests are calculated as including 35 people. The empire of the Incas, with its capit Cuzco, was founded early in the eleventh cent and had flourished for more than four centu gradually extending its conquests and absorbing numerous tribes, when Pizarro arrived on the c After the conquest Peru formed the centre of a l Spanish viceroyalty, with its capital at Lima the coast. A great but vain effort was mad 1780 82 by the Inca Indians to throw off the Spanish yoke. The indep dence of Peru was proclaimed at Lima on July 28, 1821, and was secu by the complete defeat of the Spanish Viceroy at Ayacucho in 1824. form of government in Peru has since been republican, the execu consisting of a President, two Vice-Presidents, and Ministers, with fects appointed by the president in each department, and sub-pref in each province. The legislative power is lodged in a Congress of chambers.

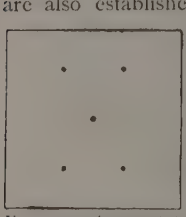

FIG. 400.—*Average population of a square mile of Peru.*

Resources and Trade.—Peru is richly endowed with nat resources of all kinds, but the great need is population to utilise them. the coast the guano of the Chincha Islands was a source of wealth for nearly thirty years, but it was exhausted in 1872, and much smaller quantities are now obtained from the Guañape, Macabi, Malabrigo, and Lobos Islands further north. In 1860 the idea of refining the extensive supplies of petroleum found in the desert between the rivers Tumbez and Chira was conceived. The fertile coast valleys produce cotton, sugar, tobacco, rice, wine spirits from the vineyards of Yca and Pisco, Moquegua and Locu The cultivable area on the coast will some day be quadrupled the extension of irrigation works. In the Andes there are nume mines of silver, copper, gold and coal, the chief centres of the sil mining industry being at Cerro Pasco and Puno; the total ou of silver is nearly half a million pounds sterling; and of copper

FIG. 401.—*The Peruvian*

The yield of wool from the flocks of alpacas, and from the vicuñas is a source of wealth peculiar to Peru. The vegetable ucts of the Andes include the finest maize in the world, the potato and al other edible roots, and there are vast areas admirably adapted for g wheat and barley, and rearing cattle. In the ravines, on the eastern s of the Andes, cacao, coffee, tobacco, and coca, another valuable uct peculiar to Peru, all of excellent quality, are produced. Among vild products are the cinchona bark and india-rubber. The chief rts of Peru are sugar, silver, cotton, wool, rubber and coca leaves. of the trade is with the United Kingdom, Germany coming nd.

ailways.—In 1902 the length of the railways in Peru was 1,035 miles. e on the coast, twelve in number, are intended to bring the produce e various fertile tracts on the river s to the ports. The work on the ellous railroad over the Maritime Central Cordilleras from Lima to o Pasco was commenced in 1870, is not yet completed. It threads ntricate gorges of the Cordilleras winding giddy pathway along the of precipices, and spans chasms idges hundreds of feet high, and nels the Andes at an altitude of 5 feet. Another line crosses the lleras from Mollendo, by Arequipa no on the shores of Lake Titicaca, the summit being crossed in a ng 14,660 feet above the sea. The line is 232 miles long, and is to be nued to Cuzco. Steamers keep up the communication between Peru Bolivia on Lake Titicaca; and the Amazonian rivers, within Peruvian ory, are navigable by steamers for 740 miles.

FIG. 402.—*The Chief Mountain Railways of Peru.*

oast Departments and Towns.—Peru is divided into eighteen rtments, of which eight are on the coast, eight in the high interior wo entirely on the navigable eastern rivers. Piura, the most northern rtment on the coast, has as its capital *San Miguel de Piura*, founded by ro. It is in a fertile valley, and a railway runs to its seaport, *Payta*. , along the coast, comes the new department of Lambayeque, also a railway to the port of *Eten*. Libertad contains the old city of *llo*, founded by Pizarro in 1535, and now the most important place of Lima. It had an excellent road to its port of *Huanchaco*, and has a railway to the port of *Salaverry*. Ancachs is partly in the ntains, and partly on the coast. It includes the Callejon de Huaylas. *raz*, the capital, is 172 miles from the port of *Chimbote*, with which it is ected by railway.

he department of Lima contains *Lima*, the capital of Peru. The city

was founded by Pizarro in 1535, and called "the City of the Kings," memory of the epiphany, and also of the two sovereigns, Juana and son Charles V. The name of Lima is a corruption of "Rimac," an ora in Quichua, and the name of the river on which Lima is built. The hou and churches are of adobes or sun-dried bricks, and great pains w bestowed on the decoration of the façades of the churches and on so houses. Lima has railways to the port of *Callao*, to the bathing resorts *Chorillos* and *Magdalena*, to *Chancay* in the north, and to the inter Callao is provided with fine piers and a mercantile dockyard. *Yca*, coast department to the south of Lima, has the capital of the same na connected with the seaport of *Pisco* by a railway; it is a pleasant to surrounded by cotton and vine estates. In this department excellent w is made, and great quantities of a spirit called Pisco which is universa drunk in Peru. The great department of Arequipa in the south has capital, *Arequipa*, founded, like so many other towns, by Pizarro, in 15 It is separated from the sea by a desert of 60 miles, and stands 7,260 f

FIG. 403.—*Lima and Callao.*

above the sea-level, with a temperate climate. The magnificent cone the volcano of Misti, 20,000 feet high, rises immediately behind the to which is built of white volcanic stone, constructed solidly with vault ceilings, to resist the shocks of earthquakes. Arequipa is in the midst a fertile plain, which is covered with fields of corn and lucerne, diversifi by fruit gardens, and dotted with villages. Part of the most southe coast department of Moquegua is still occupied by the Chileans.

Cordilleran Departments and Towns.—Within the Cordille the most northern department, bordering on Ecuador, is that of Ca marca. The capital of the same name is historically interesting fr having been the scene of the capture and death of the Inca Atahual at the hands of Pizarro and his conquistadores. Huanuco bord on Caxamarca to the south, much of its area being covered w forest round the head waters of the Huallaga. Its capital of the sa name is a pretty town. The department of Junin contains *Cerro Pasco*, 13,200 feet above the sea, the centre of the great silver-min industry. *Jauja* is a picturesque town, with an almost perfect clima

arma is beautiful'y situated in an amphitheatre of mountains clothed vaving fields of barley, on the high road to the most promising and ettled of the forest districts, that of Chanchamayu. The department ancavelica occupies the loftiest parts of the Western Cordilleras, and vns of *Huancavelica* and *Castro-vireyna* owe their existence to the rich mines and the quicksilver mine of viceregal times. Ayacucho, named he battle which secured independence for Peru, has as its capital ncient city of *Guamanga*, founded by Pizarro in 1539, and re-named *cho* since 1824. It is a fine town with stone houses, roofed with red and is beautifully situated, 5,850 feet above the sea, surrounded on es but the west, which commands a glorious view, by mountains on eep slopes of which are fields of maize, fruit gardens, and thickets of y pears. The department of Apurimac contains the lovely and valleys of Andahuaylas and Abancay, each with its picturesque town nded by scenery of surpassing beauty. Cuzco is the central depart- of Peru. The city of *Cuzco*, capital of the Empire of the Incas, in S., is situated on a tableland surrounded by mountains, 11,380 feet the level of the sea, at the foot of the famous hill of Sacsahuaman, is crowned by the Inca citadel consisting of three lines of massive built of cyclopean masonry, one of the stones being 27 feet high by et. The houses of Cuzco are of stone. The lower stories are, to a extent, of Inca masonry; the upper stories, roofed with red tiles, of later date. The fine cathedral and church of the Jesuits are built Inca palaces, and the church and cloisters of San Domingo consist of nry of the Temple of the Sun. This city is only a few miles from the and delightful vale of Vilcamayu, one of the most charming spots in avoured land. The most southern department, partly in the basin of Titicaca, is that of Puno, which includes the ravines and forests of aya. *Puno*, the capital, on the shores of Lake Titicaca, owes its nce to the rich veins of silver ore in the surrounding hills. It is now erminus of the railway from Arequipa and Mollendo, and the junction e Juliaca line with extension towards Cuzco (Fig. 402).

arts of the forests of the Eastern Andes are included in the depart- s of Puno, Cuzco, Ayacucho, Junin and Huanuco; but there are lepartments wholly within the Amazonian basin. Amazonas, with its al at *Chachapoyas*, and Loreto, with a centre of river stream navigation *uitos*, below the mouth of the Ucayali, on the Marañon. Thence ners can ascend the Ucayali and Pachitea to *Puerto Prado*, in 9° 56′ N. 75° 45′ W., the nearest navigable point on the Amazon to Lima.

eru is one of the most favoured countries in the world, except as rds the one essential of population. Embracing every climate and an te diversity of soils and aspects, she is, or might be, the producer of product, and all of unequalled excellence. Whatever Peru produces e best of its kind, while the world owes to the Incas the potato, ne, coca, and the silky fleeces of the alpaca and vicuña.

STATISTICS (*at last census, 1876*).

Area of Peru (square miles)	463,747	
Population	2,621,844	
Density of population per square mile	5·6	
Population of Lima	100,000	(103,000 in 1891
,, Callao	15,000	(35,000 in 1880
,, Arequipa	35,000	
,, Cuzco	22,000	

ANNUAL TRADE (*in pounds sterling—Estimates*).

Exports	2,000,000
Imports	1,500,000

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IV.—BOLIVIA

By Sir Clements R. Markham, K.C.B., F.R.S.

Position and Configuration.—Bolivia, formerly known as Peru, occupies the southern half of the basin of Lake Titicaca, and southern continuations of the Andes and the Maritime Cordillera. Chi conquests deprived Bolivia of her coast province in 1883; and the cou is now entirely inland. An important district extends far to the east of the Andes within the Amazonian basin. The boundary with P crosses Lake Titicaca; but to the eastward it is still in dispute.

Lake Titicaca, 12,545 feet above the sea, is 120 miles long by 40 br and is divided into two parts by the peninsula of Copacabana. southern division, called the Lake of Huaqui, is 24 miles long by 21 br and is united to the greater lake by the narrow strait of Tiquina. islands of Titicaca and Coati contain ancient ruins, and were held t sacred in the time of the Incas. The volume of water received f rivers during the rainy season is lost by evaporation between April September; and the shores of the lake are steadily receding under combined influence of solar evaporation and the silt brought down by rivers. The deepest part is on the Bolivian side; on the south-west t are large shoal areas covered with tall rushes. Much water is taken from the lake by the river flowing southwards, called Desaguadero "the drain," which has a course of more than 150 miles, and disappea the salt lake of Paria, Aullagas, or Poopo.

The Andes on the eastern side of Lake Titicaca were form supposed to contain the loftiest summits of the system, but re explorations have shown that neither of the peaks of Sorata (Ancohuma Illampu) nor Illimani exceeds 22,000 feet. The Bolivian part of Maritime Cordillera also contains peaks of great height, that of Saj

believed to be 21,028 feet and that of Tacora 19,000 feet above the The plateau between the two ranges has an average altitude of feet, with a length of 500 miles and a breadth of from 90 to 100 Four rivers flow from the eastern slopes of the Andes, two to the n, the Beni and Rio Grande forming the Mamore, chief feeders Madeira; and two to the Paraguay, the Pilcomayo and Bermejo. Bolivian Cordilleras contain the silver mines of Potosi and Oruro have been famous for three centuries, but the real wealth of the y lies in the ravines of the Eastern Andes and the forest-covered of the Beni and Mamore. It is at the head of these eastern ravines e principal modern cities are situated.

ople, History and Government.—The Indians of Bolivia to the Colla race, to whom the name of Aymara was erroneously by the Jesuit missionaries in the seventeenth century. They formed the empire of the Incas, by whom they had been conquered. The a are massive without being large; short, thick-set, broad-shouldered, ong body and short legs. The features and are good, the general expression sad, with a admixture of determination. Their chief rity is that the thigh is rather shorter than the d the whole build is admirably adapted for ain climbing. The Aymara is very resolute, can march great distances; seventy miles in one not uncommon. Their language is a dialect chua, containing many words of very ancient Their numbers have been much reduced by , but there is no reliable information respecting pulation of Bolivia. In the Bolivian part of the Amazonian basin incipal tribes are the Moxos on the Beni and Mamore, who are anised, and number about 30,000 souls, being settled in mission s, cultivating the soil and rearing cattle. The Chiquitos form a ous group of tribes between the head-waters of the Itenez and e. They are a peaceful race of cultivators, raising cotton and sugar There are also several wild hunting tribes. The people of Spanish ixed descent form only 15 per cent. of the population.

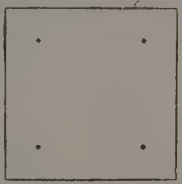

FIG. 404. — *Probable population of a square mile of Bolivia.*

er a brave struggle the Collas (Aymaras) were conquered by the rds in 1538; and in 1559 Upper Peru, or Charcas, was constituted a ency, with a Court of Justice under the Viceroyalty of Peru. In 1778 s was transferred to the new Viceroyalty of Buenos Ayres. In 1809 urrection against Spain commenced, but independence was not l until 1824, and in 1825 a general assembly of the people at saca decreed that Upper Peru should be named Bolivia in honour eral Bolivar, the Colombian general who had come to assist in the on of Peru. There is a Congress of two Chambers, and there is al suffrage for all men able to read.

Once the great industry of Upper Peru was mining, and the mine Potosi were famous throughout the world. There are still important si copper and tin mines, the output being valued at over two million pou Wool and hides are also exported from the lofty plateaux. The rich va to the eastward are called Yungas, and they are the home of the Cali species of cinchona which yields the largest percentage of quinine; w the cacao and coffee grown in the Yungas is the best in the w Coca is also largely grown and exported. In the Amazonian plains, wi Bolivian territory, the establishments for extracting india-rubber numerous and increasing.

Divisions and Towns.—There is a service by steamers across L Titicaca which connects La Paz, the chief city of Bolivia, with the rail from Puno to the coast. A railroad has recently been constructed from Bolivian city of Oruro to the Chilean port of Antofagasta on the Pa coast, and others have been projected.

Bolivia has been divided into departments, of which there are e La Paz is the most northern department. Its capital is the chief city o republic and well situated for trade. It was founded by order of Presi Gasca in 1548, and the native name of Chuquisapu was changed to *Paz*. The famous capital of the department of *Potosi* has lamentably fa off. Situated on the silver-bearing Cerro de Potosi, its population Spanish times was 160,000, and now it is barely 12,000. *Oruro*, on salt plain north of Lake Aullagas, is the capital of the department of same name, and it also has fallen from its glory in Spanish times, yet still the centre of a silver and tin-mining industry, and is connecte railway with Antofagasta. The plains of Oruro yield good crop potatoes and barley, and afford pasturage for flocks of llamas and shee

The department of Chuquisaca lies within the basin of the Pilcom a tributary of the Paraguay. Its capital, originally named La Plata, founded by order of Pizarro, in 1539; the native name is Chuquisaca the first Republican Congress ordered it to be called *Sucre*, after the President. Though the nominal capital of the Republic, and the seat university, it is not nearly so important a place as La Paz. *Cochabamb* a province of the same name in the Amazonian basin, on a tributary of Mamore, in the midst of a fertile and well-cultivated plain, is the agreeable place of residence in Bolivia. Still further east is the dep ment of Santa Cruz de la Sierra. Beni is the department which embr the region of dense forest, and the fluvial highways of the Beni an tributaries. The most southern department, bordering on the Arger Republic, is that of Tarija, which lies in the basin of the Bermejo, a t tary of the Paraguay. The town of *Tarija*, surrounded by fruit gard enjoys a charming climate.

STATISTICS (*Estimates*).

Area of Bolivia in square miles	567,000
Population of Bolivia	2,000,000
Density of population per square mile	3·5

Population of La Paz	.. ..	40,000
" Cochabamba	.. ..	25,000
" Sucre	.. ..	20,000
" Potosi	.. ..	20,000

ANNUAL TRADE (*in dollars*).

Imports	 3,000,000
Exports	 12,500,000

STANDARD BOOK.

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V.—CHILE [1]

By Alejandro Bertrand,

Professor of Topography and Geodesy at the University of Santiago; Chief Engineer of the Commission of Delimitation with the Argentine Republic.

Configuration, Geology and River Systems.—Chile is a atively narrow strip of land stretching from 18° to 54° S. between the rdillera of the Andes and the western coast-line of South America. The dth of the country varies from 70 to 140 miles, except close to the rthern and southern extremities, where it widens to 250 miles.

The general surface of the land, whilst sloping rapidly from the Cor-lera to the sea, slopes also, but ore gently, from north to south; that the central part of the strip ich at the northern extremity es to 3,000 feet above sea-level, covered by the sea in the south, ere the valleys form numerous annels or fjords, and the higher ound a swarm of islands. North 41° S. the coast is destitute of ep bays, and owing to the abrupt e of the land towards the interior presents the appearance of a chain of hills when seen from the sea. tural harbours are scarce along this coast, and nearly all are without elter from the north. In the southern archipelago, on the contrary, they numerous and well sheltered, but none of any size.

FIG. 405.—*Southern Chile and Magellan Strait.*

The upheaval of the Cordillera of the Andes, which separates Chile m the Argentine Republic, was the result of crustal movements curring long after the formation of the rocks composing the range. chief of which are porphyry, sandstones, and metamorphic rocks. e Chilean-Argentine Andes contain the highest peaks of America, one which, Aconcagua, attains an elevation of 23,000 feet. Parallel to

[1] Translated from the Spanish.

the Andes, and nearer the coast, runs a succession of lower mountains, much older formation, in which granite and gneiss predominate; a between these two ranges a plain 30 miles wide and known as the Cent Valley of Chile, stretches from 33° to 41° S. It is covered with drift alluvial deposits which form a very rich soil, traversed and irrigated by t numerous rivers descending from the Andes. The hydrographic basi of these rivers are disposed with some uniformity; as a rule, the princi valleys or canyons of the Cordillera run from north to south, and ve frequently from south to north; after the junction of the chief affluer they cross the central valley and are deflected by the coast-hills, alo the eastern side of which they run until they meet with the gaps throu which they throw themselves into the sea. The river Maule, which ente the sea about 35° S., is the first northerly one navigable for lighters small craft from the central valley. The rivers Imperial, Valdivia, a Bueno, farther south, are navigable for small steamers in the lower pa of their course. From the structure of the country all the rivers a necessarily short.

Natural Resources.—The greater part of the surface of t country is occupied by lofty mountains which, in the northern distric are treeless and almost absolutely arid. But deep in their recess valuable lodes of copper, lead, silver and manganese ores lie co cealed. In the nearly desert region of the provinces of Tarapacá a Atacama, between 19° and 26° lat., the configuration of the central vall and bordering ranges is the same as in the south; and on the weste borders of this rainless district deposits of nitrate of soda (Chile saltpetr occur on the surface. It is one of the best nitrogenous manures, a more than 400,000,000 tons have been extracted and exported, main to Europe. Metallic lodes, chiefly copper and iron-pyrites, also abou throughout the country, especially in the spurs of the Andes. Abo 37° S. beds of lignite are to be found. Alluvial gold occurs nearly a over the country, but the placers yield a poor return. In the central regi there is an abundant supply of calcareous rocks useful for the manufactu of lime and cement. Native sulphur occurs abundantly in the Cordiller and gypsum is still more widely distributed. Fine granite and especial trachyte is quarried and makes excellent building material. Through the country there is clay for brick-making, and kaolin for manufacturi porcelain is also plentiful. In almost all the valleys of the Andes the are mineral springs possessing medicinal properties. Wood for fuel a coal exist in nearly every part of the country. From the 34th parall southward indigenous trees are found in increasing quantity, but wit out much variety of species; the timber they yield is firm and hard, b somewhat heavy. European trees, especially the poplar, are very easil acclimatised; the Australian blue gum (*Eucalyptus globulus*) has al increased considerably. A large portion of what was formerly woode land has been cleared and converted into fields and pastures.

The native fauna is not abundant in species, even in the woodlands. only noxious carnivorous animal is the puma (*Puma felis*), which is t the size of a large dog. The imported quadrupeds and birds mul- with great facility.

Climate.—In Chile there are all climates. The temperature is in eral lower than that corresponding to the same latitudes on the hern hemisphere on account of the cold Humboldt current, ch flows along the coast from south to north. In the north, as far o° S., rain is the exception, although dense clouds are of frequent rrence; on the other hand, from 36° S. southwards, rain falls on t days, especially in winter; the largest rainfall occurs about S. The winds which prevail on the coast are chiefly from the and south-west. The climate of the central valley and of the coast veen 32° and 36° S. is one of the most pleasant in the world, the mometer seldom rising above 77° F., or falling below 32°. This region the same time, one of the healthiest to be found anywhere, because slope of the land secures good drainage and prevents the formation of shes.

People.—The principal of the aboriginal peoples of Chile and the only of which genuine representatives now remain in country, leaving the Fuegians out of account, is commonly known as the Araucanian, a race nguished by its endurance, its valour and its in- itable character. Of the blood running in the s of the present population of Chile, especially ie lower classes, a large proportion is Araucanian; ancestry entails many good qualities, but also e vices, chiefly a propensity to drink. The edu- d classes consist almost entirely of the descen- s of the Spanish conquerors who settled in Chile in the sixteenth ury; and these have preserved the language and religion of Spain, out alteration, as well as most of the habits and social customs of the ner country.

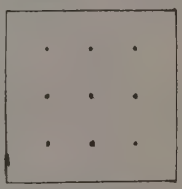

FIG. 406.—*Average population of a square mile of Chile.*

History.—The conqueror and first governor of Chile was the nish soldier Pedro de Valdivia, who founded the capital, Santiago, 541. According to the Spanish system of colonising, the companions aldivia, and also their successors and descendants, divided amongst nselves the natives of the conquered land, and employed them working the mines, extracting gold and cultivating the soil. ough Spanish colonies were settled all over the Araucanian territory after the conquest, the dauntless natives succeeded in regaining rge part of their lands; and it can be said that, up to the middle he nineteenth century, a stretch of territory extending for about miles between the rivers Biobio and Valdivia, remained in the ds of the Araucanians. In 1810, the royal power of Spain having been

suspended in the Spanish colonies, the first national government of Ch was established. Three years later, the forces sent from Peru by Spa

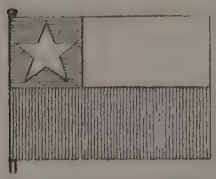

FIG. 107.—*The Chilean Flag.*

reconquered the country, but, in 1817, Chile s ceeded in finally regaining its independence, a General O'Higgins, the head of the governme assisted by the celebrated naval volunteer, Lo Cochrane, and the Argentine general, San Mart attacked the Spanish army of Peru. With the ception of a few revolutions of no lasting charact Chile has since been able to pursue its devel ment peacefully, and its democratic institutions have been gradually taki root. In 1879 a war broke out between Chile and the neighbouri republics of Peru and Bolivia, which resulted in the acquisition by Ch of the territories of Antofagasta and Tarapacá.

Government and Administration.—The form of government republican. All the functionaries in the department of Administration designated by the President. Prior to 1890, the government, or rather president, was in reality the chief elector of Congress; but since the re lution of 1891 the country has asserted its electoral rights, and Minist are now appointed by Congress. The wealth accruing to the Chil treasury from the tax on nitrate of soda, since 1880, has been the means giving a great impulse to the administration, to education, to the navy, army, and the railways, which almost all belong to the State. The muni palities, which were formerly departmental and directly subordinate to central government, are now communal and have complete local s government; but they are for the most part poor, and require assista from the national Treasury.

Industries and Commerce.—The staple industry of the country the extraction of nitrate of soda, of which substance between one and and a half million tons are exported annually. The annual exports iodine extracted from the nitrate amount to about 300 tons. Next importance comes the working of the silver, copper and gold ores, bo and coal, the export of which yields about two and a half million pou sterling yearly.

Agriculturists are concerned mainly in the cultivation of cere tobacco, vegetables, vine-growing and cattle-breeding. The m advanced agricultural industries are flour-milling, wine-making, and preparation of cheese, dried and preserved fruits and honey. Ot industries, such as tanning, shoemaking, distilling and brewing are very advanced, and are chiefly carried on by the German colony in province of Valdivia.

Means of Communication.—There are two lines of British German steamers with fortnightly sailings for Europe *viâ* the Strait Magellan, and a weekly steamer service to Panama, as well as coast steamers. The journey from Santiago to Buenos Aires through the Cor

takes three days and a half, and is closed by snow from June to ober, the winter months. Santiago is connected with Valparaiso and cepcion by a railway which extends to Valdivia, and there are various r lines. The plains are netted with roads, and there are roads, in eral mere cattle tracks, in the Cordillera also.

The Chief Towns of Chile.—*Santiago* (33° 30′ S.), the capital, is ated at the foot of the spurs of the Andes, on the banks of the little r Mapocho, which flows through the town in a stone channel 130 feet e, and on the eastern border of an extensive and fertile plain watered anals from the river Maipo. The town rests upon a firm subsoil of t depth covered by deep layers of vegetable mould. The streets of iago are wide, straight and laid out at right angles. The steep slope n east to west facilitates drainage, and ensures the good sanitary ditions of the town. Its special features are the Santa-Lucia hill, a uresque rocky eminence 230 feet high, close to the business quarter, ch has been converted into a handsome promenade, and the Alameda, venue over a hundred yards wide and two miles long, which is the f highway. Santiago possesses the State University, beside numerous blishments for technical and superior instruction.

Valparaiso (33° S.) is the chief port on the west coast of South America. the terminus of im- ant lines of steamers Europe *viâ* the it of Magellan and ama, and the centre he coasting services. ontains a numerous ign colony, com- ed chiefly of British, man and French lers. The harbour ell sheltered on the th and south-west, is completely open the north; as a ter of fact, however, the wind seldom blows from that quarter. There Custom House wharf, alongside which steamers of ordinary tonnage moor; but most of the loading is done by lighters from a quay sur- nding the town. The whole of the harbour is defended by modern, l-mounted batteries.

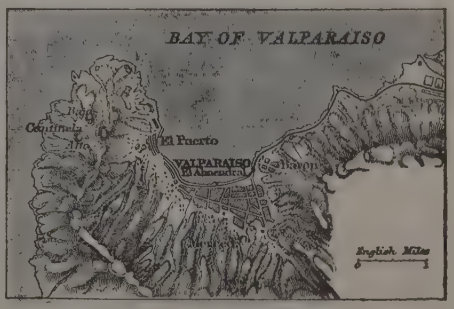

FIG. 408.—*The Site of Valparaiso.*

Iquique (20° S.), built in the middle of the desert, is the most important on the Tarapacá coast for the shipment of nitrate. This town has, ng other great public works, a supply of drinkable water brought down n the Cordillera by a large canal. *Copiapó* (27° S.) is now insignificant, it was formerly, when silver commanded a high price, a silver-mining

centre of very great importance. The Copiapó valley, though narrow, very fertile, and is the most northerly point of Chile to which agricultu has been carried. *La Serena* (30° S.), situated close to one of the be Chilean ports, *Coquimbo*, is the chief town of a province boasting a me delightful climate, but owing its importance to its mineral wealth, and numerous metallurgical establishments.

Concepcion (36° 20′ S.), situated at the mouth of the Biobio, the large river in Chile, is the commercial centre of the whole southern region far as the river Cautin, about 38° 30′ S. A railway connects it wi Santiago; with old Araucania, an agricultural, wooded region of conside able importance; and with the coal-bearing coast region to the sou The port of Concepcion is at *Talcahuano*, situated in the beautiful a extensive bay of Concepcion. Talcahuano has a first-rate dry dock, bu of stone, round which a large military port is being constructed. For t defence of the bay modern batteries have recently been erected. *Chill* is the centre of a large trade in cattle, chiefly cattle and horses. *Tal* (34° 40′ S.) is an inland town, situated in the middle of the old agricultur district, the natural outlet of which, before the trunk railway was bui was the port of *Constitucion*, at the mouth of the river Maule.

Valdivia (40° S.) at the mouth of the Calle-Calle and *Puerto-Montt* in t Gulf of Reloncaví, are two important ports of the southern region; th development is due chiefly to the German colonists who settled in th part of the country about 1850. *Punta Arenas* (53° S.) is the capital a only town in the territory of Magallanes, which now contains a lit over 5,000 inhabitants. The breeding of animals producing wool is t chief industry in this region, but there is a little gold-mining. In t western archipelago seal-hunting is carried on on a large scale. Pur Arenas being situated in the middle of the Strait of Magellan, is, in sp of its remoteness, a calling station for European steamers.

STATISTICS.

	1885.	1895.
Area of Chile (square miles)	293,000	293,000
Area inhabited before 1880	115,000	115,000
Population of Chile	2,527,000	2,980,000
Density of Population per square mile	9	10

POPULATION OF CHIEF TOWNS.

	1895.	1898.		1885.	1895.
Santiago	256,400	302,000	Talca	33,200	40,000
Valparaiso	122,500	140,000	Iquique	33,000	33,000
Concepcion	40,000	50,000			

ANNUAL TRADE (*in pounds sterling*).

	1871–75.	1881–85.	1891–95.
Imports	6,930,000	8,755,000	12,444,000
Exports	6,440,000	10,706,000	11,603,000

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W. A. Smith. "Temperate Chile." London, 1899.

CHAPTER XLV.—THE RIO DE LA PLATA COUNTRIES

I.—THE ARGENTINE REPUBLIC

By H. D. Hoskold, F.G.S.,

Director-General of the Department of Mines and Geology, Argentine Republic.

Position and Extent.—Argentina, or the Argentine Republic, termi-
es the South American continent, being situated between the parallels of
and 55° S. From the apex at Cape Horn to the Island of Martin Garcia,
34° S., and 58° W., it is bounded on the east by the Atlantic Ocean and
Rio de la Plata or River Plate; and further north its north-eastern and
thern limits are determined by the republics of Uruguay, Brazil, Para-
y and Bolivia. The western limit, forming the boundary with Chile,
s from 23° S. to 43° S. along the high summits of the Cordillera of the
des where it coincides with the continental watershed; from 43° S. to
S. it continues in some places along the mountains of the Cordillera,
others along the continental watershed close to the eastern foot of the
des. The boundary between Bolivia and Argentina was delimited by a
xed commission in 1903. The country has been constitutionally divided
o fourteen Federal Provinces, and the less developed regions have
en divided into nine Territories. Six of the first-named are mining
l agricultural, and others are purely agricultural provinces. From
S. southward, the east coast is usually low but irregular in level.
is much indented, forming various important bays such as Bahia
anca, the Gulf of San Matias, and those of San Jorge, Deseado,
n Julian, and others. The principal ports are at Buenos Aires, Bahia
anca, and La Plata; they are of artificial construction, and suffi-
ently large to accommodate an immense shipping traffic. The military
t of Bahia Blanca is in construction, and other ports are projected along
Argentine coast, but natural harbours are few. No special trigono-
trical survey has, as yet, been attempted by the government, but the
at meridianal extent of the country (more than 33° of latitude) would
e especial scientific interest to an exact survey which might throw new
ıt on the figure of the Earth.

Surface and Configuration.—The surface is naturally divided into
ensive tracts of low and nearly level land, and elevated regions. The
ins extend from Buenos Aires northwards to the Chaco, westward to the
vn of Mendoza, and southward through Patagonia; but their monotony
elieved by various small chains or groups of mountain ranges, such as
se of San Luis, Cordoba, Tandil, Ventana, Pampa Central, Rio Negro,
l Chubut, which divide up the plains. Minor groups of hills also occupy

small areas in the western portion of the province of Entre Rios, and Sa
tiago del Estero. The foot-hills and slopes of the Andes form extensi
groups or chains of mountains of great altitude, occupying large areas
the provinces of Tucuman, Salta, Jujuy, Catamarca, La Rioja, San Juan, a
Mendoza. This system of mountain chains extends southward, especial
in the western portion of the national territories of Neuquen, Rio Negr
Chubut, Santa Cruz, and also in Tierra del Fuego. In the north-easte
portion of the republic, in the territory of Misiones, extensive but low
highlands occur, a continuation of the eastern mountain system of Braz
The highest mountains rise along the Andean Cordillera, the culminati
summit of which is Aconcagua (23,080 feet). The immense rocky ma
of the Andes, with its various ramifications, covers a large area both
the Argentine and Chilean republics. The Andean provinces of t
Argentine Republic are very rugged and broken, leading up to the cres
line which is divided by various passes, and abounding in profound gorg

Geology. The Andean region has been subject to various depre
sions and elevations, the last occurring at the close of the Tertiary perio
Denudation has removed from the Argentine Andes a great thickness
rock, leaving the gneiss and granite visible over large areas. The usu
intrusive rocks are common, and patches of Jurassic, Rhætic, Triassic a
Silurian exist in places. The Tertiary underlies the Pampean, and is see
along the banks of the Parana, in Entre Rios, Cordoba, Corrientes, alo
the Patagonian coast, Strait of Magellan, and Tierra del Fuego. Mass
of basalt occur inland along the river Santa Cruz. The Tertiary is believe
to meet the Pampean formation along the Rio Negro. The geology of t
northern and north-eastern part of the republic is little known, no offici
geological map having, as yet, been made.

Rivers and Lakes. The principal rivers are the Parana and Urugua
uniting to form the great estuary of La Plata. Further north, the Para
takes the name of Paraguay, the chief tributaries being the Pilcomayo (t
boundary of the republic towards Paraguay), and Bermejo, from t
Andes, each of which receives various smaller streams. The province
Cordoba is watered by the rivers Primero, Segundo, Cuarto, and Tercer
the last named joining the Carcarana, a tributary of the Parana. The riv
San Juan, flowing from the Andes, is joined by the Mendoza, Diamante a
Atuel, and enters the river Colorado which flows into the Atlantic Ocea
south of Bahia Blanca. The Neuquen and Limay are tributaries of t
Rio Negro, running parallel to the Colorado further south, and al
falling into the Atlantic. Patagonia is drained by the rivers Chubu
Santa Cruz and Gallegos. The lakes situated along the base of t
Andes are numerous, and some of them very beautiful, such as Lak
Nahuel-Huapi, one of the sources of the Rio Negro, and especially Lak
Fontana, a source of the southern affluent of the Chubut. Other lakes
a different type occur on the lower ground, many of them, such as t
large Mar Chiquita in the province of Cordoba, being without outlet.

Climate.—The Argentine Republic may be divided into four zones of ring temperature. The first includes the low plains of the north, situated ween the parallels of 22° and 31½° S., and is of a tropical character; the ond comprises the section of the plain from 31½° to 42° S., and is tempe- ; while the third, or southern part of the plain, from 42° to 55° S., is ost frigid. The fourth, or mountain zone, extending the length of the ntry, affords a variable climate, depending upon the seasons of the r, the difference of altitude and latitude.

During summer, great heat occasionally prevails in the open, low and rated plains or campos, some of which are situated as plateaux inclosed igh mountain chains. Some of these campos are covered to a con- rable thickness with finely pulverised pumice, deposits from volcanic tions, which causes the heat to accumulate and become almost unbear- . The northern divisions of the plain, including Buenos Aires, Santa Entre Rios, Corrientes and Chaco, are not subject to anything like re winters. From Buenos Aires, southward, the hot season is modified he influence of the Atlantic Ocean and by thunderstorms. Generally provinces are very healthy and the people take no harm from sleeping ie open, a very common practice. Smallpox, yellow fever, and cholera not native diseases, but have been imported from Brazil and Italy. i epidemics have not been known since 1886. Since that epoch strict tary measures and great vigilance have kept Buenos Aires free. se regulations and the water and drainage system of the capital have ed Buenos Aires as a healthy city in the first rank.

Flora and Fauna.—Extensive forests of algarroba trees (*Prosopis alba*), bracho, cedar, and many other varieties exist in the territories of Chaco, mosa, Misiones and the provinces of Santiago del Estero, Tucuman, y and Salta. Several companies are established in the Chaco, converting timber to commercial uses. In these forest regions there is a dense ical undergrowth, consisting of shrubs, climbing, flowering and icinal plants of the greatest variety. The *Yerba-mate* from Misiones great commercial value, the leaves being collected and used in the e manner as tea. Nearly all the lower-level valleys in the interior vinces are well wooded. The open campos are generally covered a stunted thorny scrub, almost impenetrable; but frequently mixed algarobas. Cardone (*Cacti gigantia*) grows on the mountain slopes La Rioja, and in some other places. The western mountains running hwards through the territories of Neuquen, Rio Negro, Chubut and ta Cruz, are covered with dense forests, including several varieties of ches and pine, from a considerable height down to the margin of the ns. The mountains surrounding the Strait of Magellan and Tierra del go are covered with immense forests of beech. Winter-bark trees *mys winteri*) are common in these regions, and various shrubs yielding le berries. Orchids of great beauty and variety are also plentiful. The ntic seaweed, *Alga macrocystis*, is common on the southern coasts and

Tierra del Fuego. Such fruit trees as are common to Europe are fou here in great abundance, including various tropical fruits such as orang lemon and other trees. Grapes of all kinds are cultivated extensivel and wine is made. Yet, in spite of these extensive woodlands, t central parts of the Argentine Republic are almost treeless, forming va level expanses of grass land known as pampas, admirably adapted f cattle raising, and possessed in many parts of a fertile soil repayi cultivation.

The principal wild animals are American tiger (*jaguar*) and lion (*puma* species of wolf, fox, mountain cat, guanaco, vicuña, and chinchilla. Tw kinds of bears are reported to exist in the northern parts. Several specie of deer, the tapir, ant-eater, a very small armadillo, and a great variety monkeys also occur. The condor of the Andes is the chief bird of prey, an the falcon family is largely represented. The large American ostrich and smaller representative of the same family in Patagonia are numerou Parrots, paroquets, and humming birds are remarkable for their numbe variety and beauty. Fish abound in the rivers and lakes. Among insects, probably the blood-sucking vinchuca (*Conorhinus infestans*), in th western provinces and in the Chaco, a small red insect that penetrat under the nails and skin, are the most odious.

People and History.—The ruins of ancient buildings and potte have been discovered proving that at least one of th tribes of Indians inhabiting South America possesse a high degree of civilisation, and it is possible that th tribe represented the original inhabitants. At th conquest in the sixteenth century the Spaniards mixe to a great extent with the Indians, the consequence of which are still to be traced. The admixture Indian blood is not so marked in the Argentine as some of the surrounding republics, a fact due pri cipally to the great influx of immigrants from all Eur pean nations. The country gained its independence in 1810, and was forme into a federal republic. The legislative affairs are managed by a Congres formed of Senators and Deputies from all parts of the republic, and th President and his Ministers form the administrative power. The national and official language is Spanish, but many others are spoken in the large towns. The State religion is Roman Catholic, but all others are tolerated. The Government is based upon liberal, tolerant and equitable principles, and although the two classes of government, Federal and Provincial, at one time gave rise to internal aggressions and civil strife, this has long since ceased to be the case. Foreigners may become citizens at pleasure but there is no legal compulsion.

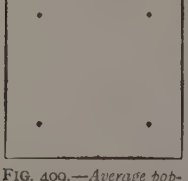

FIG. 409.—*Average population of a square mile of Argentina.*

FIG. 410.—*The Argentine Flag.*

Communications and Resources.—The level surface of the eastern central plains has led to a great development of railways, bringing the ef provincial towns into touch with the capital and chief seaport, Buenos es. The vast area of good unoccupied land promises great future pros-ity when the resources the country are fully ised.

Economic minerals of rly all kinds exist; those st abundant are copper s mixed with gold and er; auriferous mine-, silver, antimony, lead, bismuth, iron ore, l, salt, nitrates, borax, bles, sulphur and pe-eum also abound. In provinces of Jujuy, La ja, and San Luis, and he territories of Neu-n, Chubut, and along Patagonian and Tierra Fuegian coasts, there alluvial gold deposits. Agriculture is followed a considerable extent; so is stock raising, ge herds of cattle and nense flocks of sheep ng kept. Various estab-

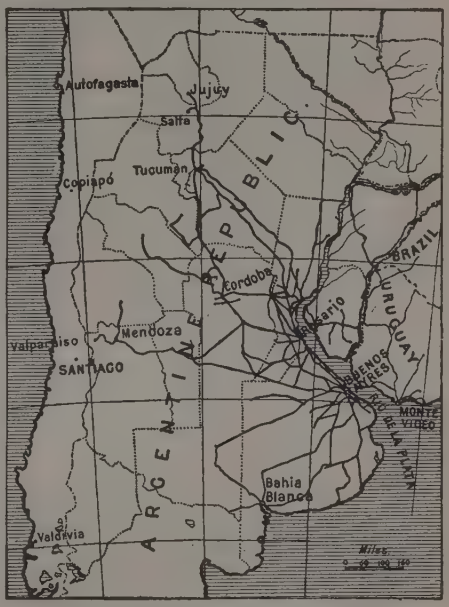

FIG. 411.—*The Railway System of Argentina.*

ments are engaged in the preservation of meat, and the preparation of at-extracts, cheese and butter. The staple exports consist of live mals, wool, corn, meats, hides, timber, sugar and minerals.

The Littoral Provinces.—The fourteen federal provinces of the ublic may be conveniently grouped into the Littoral or Coast Provinces the sea coast or on the great navigable rivers, the Central Provinces, the dean Provinces in the west, and the Northern Provinces. As a rule the ital of each province bears the same name, and is the focus of the com-rcial as well as of the social provincial life. In addition to these pro-ces, and making up fully two-thirds of the area of the country, are the e large thinly-peopled national territories, situated to the north and the th of the compact group of the provinces.

Buenos Aires is the capital of the republic, situated on the right bank of river Plate in 34½° S. and 58½° W., and only 33 feet above sea-level. possesses a large port sufficient for the accommodation of a great trade;

the construction of the harbour on so shallow a shore was an engineeri
feat of no little difficulty. It contains many elegant public buildings, a
is the principal centre
the railways and comme
of the country. The affa
of the national governme
are carried on in this ci
the cosmopolitan charac
of which is indicated
nearly all the languages
the world being spok
The large and handso
squares which embellish
are adorned with co
memorative monuments
departed heroes and ill
trious persons. *La Pl*

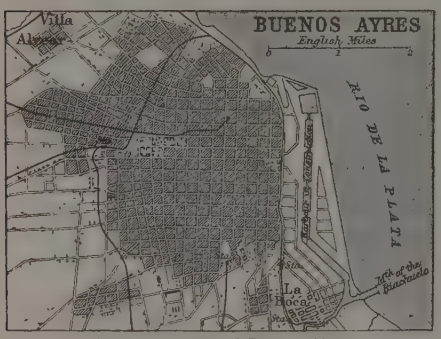

FIG. 412.—*Plan of Buenos Aires.*

is the capital of the province of Buenos Aires, one of the largest in t
Federation, and is situated in 35° S. and 58° W. It is a very handso
town, with a port: its prosperity depends upon general commerce and t
produce of the province, which is principally agricultural. *Rosario*, in t
province of Santa Fé, on the margin of the river Parana, stands in 33°
and 60½° W. It is an important city, and a great railway centre. Its expo
are shipped direct to Europe, competing in some measure with the tra
of Buenos Aires, as it is the principal river port not only for its o
province but for others surrounding it. *Santa Fé*, the capital city of t
province of the same name, is also situated on the Parana, but further
the river, at an altitude of 393 feet above sea-level; it also has a po
Agriculture, stock raising, and the production of fruit, corn, butter a
cheese are the staple industries of the province. *Parana*, on the l
bank of the Parana river, opposite Santa Fé, is the capital of the p
vince of Entre Rios, which, as its name implies, occupies the la
between the rivers Parana and Uruguay. It is generally level, but und
lating, or even mountainous in parts, and is well watered. Agriculture a
stock raising are carried on extensively. It exports corn, cheese, butter a
live stock, and is in a very flourishing condition. *Corrientes*, on the Para
is the capital of Corrientes, north of Entre Rios and the most easte
province of the republic. Like the other provinces of this group it
devoted to agricultural pursuits. The territory of Misiones stretches
the north-east, between Brazil and Paraguay.

Central Provinces.—*Cordoba* city is situated in a depression of
undulating plain in 31⅓° S. and 64° W., 1,440 feet above sea-level. It
very irregularly built, but it has a university and a cathedral, while t
national astronomical observatory is situated upon a rise overlooking t
city. It is supported chiefly by commerce, some agriculture, stock raisi

mining; the mines, however, are not much worked. At no great distance surrounded by mountains of moderate height, but the valleys between n are well watered, with woods and patches of beautiful scenery. The rthern Railway passes through the city on its way from Buenos Aires Rosario to Tucuman and Salta. *San Luis* town, situated almost due of Mendoza on the Western Railway, is the capital of the province of Luis, a stretch of undulating land west of Cordoba and intermediate ween the plain and mountains. It carries on mining, agriculture and ck raising. *Santiago* is the capital of the province of Santiago del ero, north of Cordoba. The position of the town is 28° S. and 64° W., its elevation is 530 feet above sea-level. It is mainly an agricultural vince, but suffers as yet from inadequate means of transport.

Andean Provinces.—*Mendoza* city stands in a nearly level plain in ° S. and 69° W., 2,320 feet above the sea. Viticulture, stock raising, corn wing, and mining are the industries of the province, which borders on Andes, and has a very small rainfall. A terrible earthquake occurred 1861, destroying many buildings and causing great loss of life in the . It stands on the Western Railway, which has been continued from enos Aires into the Cordillera of the Andes in order to connect with the lean lines, but is not finished. *San Juan*, the capital of a province of same name north of Mendoza, is situated upon an almost level plain in ° S. and 69° W., at an altitude of 2,165 feet. Like Mendoza, the town of n Juan is sheltered on the west by the Andes. It depends upon viti- ture, agriculture, stock raising, and mining. *La Rioja* is situated in S. and 67° W., at an altitude of 1,670 feet. The province of which it he capital depends chiefly upon mining, but has some viticulture, agri- ture and stock raising. Its aspect is generally mountainous, with level ins between the descending spurs of the eastern Andes. It is connected a branch line with the Northern Railway. *Catamarca* is the capital of province north of Rioja, and stands on an undulating plain, surrounded no great distance by mountains at the foot of the eastern Andes, in S. and 66½° W., 1,722 feet above sea-level. Mining, viticulture, some ck raising, and agriculture are carried on in this province. A branch he Northern Railway from Buenos Aires reaches the town.

Northern Provinces.—*Tucuman*, the capital of the smallest province he Federation, is situated in 27° S. and 65° W., at an altitude of 1,520 t. Sugar cane is largely grown in the neighbourhood, and there are ious sugar manufactories, the produce of which is largely exported. ize and other grain and tobacco are grown. Ancient mines exist in the untains of this province, but they are not exploited. The province con- ns forests of timber, and tropical undergrowth, and is traversed by the rthern Railway. *Salta*, in the valley of Lerma, is situated in 24½° S. d 65° W., at an altitude of 3,790 feet. Mining is carried on in the moun- nous province of the same name, and also some agriculture. There are portant forests of timber in the eastern part of the province. Coffee and

tobacco are grown. The province is bordered on the east by the ter tories of Chaco and Formosa. *Jujuy* is one of the most northerly tow in the republic, being situated in 24° S. and 65½° W., on the verge of t tropic, but at an altitude of 4,050 feet, on an undulating plain surround by mountains. Mining is carried on in the province together with certain amount of agriculture. Sugar-cane is grown extensively, as w as coffee and tobacco, and there are forests of timber trees.

The Territories.—Taken as a whole one quarter of the inhabita of the Argentine Republic live in the larger towns of the federal provinc Of the total population in 1895 only 103,400 were returned as inhabiti the nine national territories (giving a density of population of 0·1 p square mile), although the total area of these territories is more th twice as great as that of the fifteen federal provinces which had a dens of population exceeding 7 to the square mile. The three northe territories, Misiones, Chaco and Formosa, are tropical. South of the p vinces there are six territories, the Pampas and Neuquen, next to the settl portion, those of the Rio Negro, Chubut and Santa Cruz in Patagonia, a the isolated eastern half of Tierra del Fuego in the far south.

STATISTICS.

	1869.	1895.	190
Area of the Argentine Republic, square miles	1,135,840	1,135,840	1,135,
Population of the Argentine Republic	1,877,490	4,044,911	4,894,
Density of population per square mile	1	4	
Number of foreigners in the Republic	——	1,004,527	——

POPULATION OF THE CHIEF TOWNS.

	1895.	1901.		1895.	190
Buenos Aires	663,854	836,381	La Plata	43,406	35,
Rosario	23,169	112,461	Mendoza	28,808	29,
Cordoba	42,783	50,000	Santa Fé	22,244	25,
Tucuman	34,297	50,000	Parana	24,099	25,

ANNUAL TRADE (*in pounds sterling*).

	1871–75.	1881–85.	1891–9
Imports	11,900,000	15,300,000	19,800,
Exports	8,700,000	13,200,000	21,500,

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W. H. Hudson. "The Naturalist in La Plata." London, 1892.
—— "Idle Days in Patagonia." London, 1893.
M. G. and E. T. Mulhall. "Handbook of the River Plate." London, 1893.
C. Wiener. "La Republique Argentine." Paris, 1899.

II.—URUGUAY

By Alexander F. Baillie,

Consul for Paraguay in London.

Position.—The official name "La Republica Oriental del Uruguay," Republic on the eastern bank of the river Uruguay, very clearly locates t position of this small South American State, lying south of Brazil betwe the 30th and 35th degrees of south latitude and 52nd and 58th degrees west longitude. On three sides it is bounded by water; on the east by t Atlantic Ocean, and on the south and west by the rivers Plate and Urugu which form the division between it and the Argentine Republic.

Configuration.—The country on the coast of the Atlantic and river
ite may be regarded as a gently undulating plain covered with magnifi-
nt pasture lands, well watered but sparsely timbered ; while in th.
erior it is broken by several low mountain ranges, rising to an elevation of
le more than 2,000 feet, and the forests are larger, though the trees are
where of any great size. The mountain chains form the watershed of
numerous rivers that intersect the land. The Uruguay itself, from which
republic takes its name, has its origin in Brazil and is upwards of 1,000
es in length, but navigation is impeded by the lofty cascade at *Salto*, a
vn of some importance, situated about 20 miles below the river Arapey,
d about the same distance above the Daiman, which are tributaries draining
surrounding mountainous ranges into the main river. Other tributaries
the Queguay and the Rio Negro, the latter of which divides the whole
ntry from north-east to south-west into two nearly equal portions. The
nta Lucia and San José unite together and flow into the river Plate
ove Montevideo, while the Yaguaron, the Tacuari, and the Cebollati
in the area east of the Cuchilla Grande, and feed the great lake of
erim, which is partly situated in Brazil, and is a remarkable hydrographi-
feature on the eastern side of the country.

Climate and Resources.—The climate is mild and healthy. The
d is never excessive, and frosts are unknown ; in summer the heat is in-
se, but is tempered by the breezes from the Atlantic Ocean. Uruguay
s no Indians on the frontiers to disturb the peace, and it has no ferocious
mals to devastate its flocks and herds. It is a remarkable fact that the
scacha, or Peruvian hare, which burrows the land in all directions on
e western side of the Uruguay to the great detriment of sheep and cattle-
mers, has never been found on the eastern border of that river. The
ly indigenous mammal of any size is the *Cervus campestris*, a species of
er common to all the pampas of the river Plate. The capybara, or
ter-hog, is the largest rodent in the world. Birds are numerous, and
clude ostriches (*Struthio rhea*), vultures, and carrion-feeding hawks,
eat numbers of ground-partridges (*Northura major*), and a variety of
ng birds, among which the most remarkable is a mocking-bird called
the inhabitants "Calandria." The rich undulating pasture lands are
ll adapted for the breeding of vast herds of horned cattle, which are
d to be larger, and to carry a heavier hide than those in the neigh-
uring Argentina, on account of the phosphates and alkaline silicates
the soil, but the sheep are smaller, and the wool inferior in quality.
oreover the plains are better timbered than the true pampa of Buenos
res, and the trees, although stunted and of small value in themselves,
ord protection to the herds from the great heat of the sun. The breed-
g and slaughtering of cattle are the most important occupations of the
habitants, for very little has been done in the promotion of agriculture.
vsandú, on the river Uruguay, and Montevideo, the capital, are the great
ntres of the "Saladero" business. At the former, about 250,000 head of

cattle are killed annually, and the carcases are prepared to meet th requirements of the different markets to which they are consigned. "Carn seca," or sun-dried beef, is largely exported to Brazil, while corned-beef an tinned ox-tongues find a ready sale in Europe. At Fray Bentos, south Paysandú, there are large establishments for the manufacture of extracts meat, which, with hides, tallow, horns, bone-ash, wool and sheep skins, a the principal articles of export trade

Gold, silver, iron and copper ores occur over a large area. The riverin department of Salto yields jasper, porphyry, alabaster and agate, whic are exported, chiefly to Germany.

People and Government.—The original stock of the present popu lation of Uruguay differed widely from that of the neighbouring republic

FIG. 413.—*Average population of a square mile of Uruguay.*

The latter are inhabited by races which have sprun from the alliances of the European conquerors wit the aborigines, but the early settlers in the Banc Oriental were already a mixed race at the time their advent. The City of Montevideo was founde in 1717, as a military outpost, by the Royal Governo of Buenos Aires, and so remained until 1726, whe a large immigration from the Canary Islands too place. The inhabitants of these islands were de cendants of Spaniards and of the native "Guanchos mingled also with Norman, Flemish and Moorish blood. The aborigin Guanchos were a brave, peaceful shepherd race, who regarded the trad of "butcher" as being so degrading and ignominious, that no membe engaged in that occupation was permitted to associate with his fello countrymen. The fact is noteworthy, seeing that the descendants these people are probably the greatest cattle-slaughterers in the worl In 1821 the country was annexed by the Empire of Brazil, but in 18 its independence was recognised, and was guaranteed by the Britis Government. Of the people 70 per cent. are native born, the residu consisting of Europeans of several nationalities, but chiefly Italian.

Government and Towns.—The administration consists of tw Houses of Parliament, the Senate and the Chamber of Representatives, and the Executive is given by the Constitution to a President who is elected for four years. Uruguay is, however, one of the worst governed of all the civilised nations of the world. The administration is in the hands of a few individuals who have the control of the army, and who make and unmake the Presidents, of whom no less than three have been assassinated during 30 years. The language spoken is Spanish, and the State religion is Roma Catholic, but there is complete toleration. The republic is divided in nineteen departments.

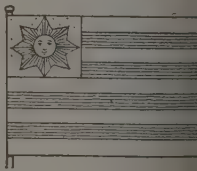

FIG. 414.—*The Uruguay Flag.*

Montevideo, the capital, takes its name from the Cerro, or Mount, which nds at the extremity of a semicircular bay. The city is built on a omontory between the bay and the estuary of the river Plate. If a eakwater, which is urgently required, could be constructed for the pro- ction of shipping, it uld become one of the st important cities the eastern coast of uth America. The gest inland town is *n José*, 50 miles from e capital, and *Colonia* the river Plate, *Pay- ndú*, *Salto*, *Fray Bentos*, d *Santa Rosa*, all do a nsiderable trade, but no case does the pulation of any one them exceed 5,000.

FIG. 415.—*The Site of Montevideo.*

he means of communication in the southern districts of the State are rly good—more than 1,000 miles of railway are open to traffic, and the ore distant northern towns are connected with the railway termini by eans of coaches. There are also over 4,000 miles of telegraph lines.

STATISTICS (*estimates*).

Area of Uruguay in square miles	71,700
Approximate population (1896)	840,000
Density of population per square mile	12
Population of Montevideo	243,000
Imports in dollars (1892-96)	22,000,000
Exports " "	30,000,000

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III.—PARAGUAY

By Alexander F. Baillie,
Consul for Paraguay in London.

Position and Extent.—The name Paraguay was at one time applied a very large portion of "the gigantic province of the Indies," as the panish possessions in South America were generally entitled in the reign of e Emperor Charles V. It formed a province of the Viceroyalty of Peru nd included parts of the present republics of Bolivia and Brazil, and the hole of the vast area between those countries and the rock-bound coast

of Patagonia. International treaties, and armed conflicts, have from ti
to time reduced its limits, but its area is still considerably larger th
that of Great Britain and Ireland. The country lies on both sides

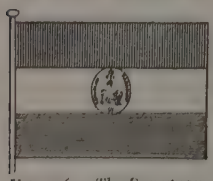

FIG. 416.—*The Paraguay Flag.*

the river Paraguay; the eastern portion of Pa
guay proper, which is nearly in the shape
a parallelogram, lies between latitude 22° a
27° S. and longitude 54° and 58° W., while t
triangular figure of Western Paraguay, or t
Gran Chaco, extends from 25° to 21° S., and
longitude from 58° W. to an undetermin
dividing line supposed to be about 62° W. T
country is surrounded on the north and nor
east respectively by Bolivia and Brazil, and on the south and west by t
Argentine Republic.

Configuration and Rivers.—On the eastern frontier of Paragu
proper the low Sierra de Amambay stretches from north to south; it
crossed from east to west by several other chains of mountains, and
divided about latitude 24° into two branches, one of which takes
southerly course and forms the Cordilleras of Caaguazú, of Villa Rica a
of Los Altos, while the other proceeding in an easterly direction under t
name of the Sierra de Mbaracayú, crosses the Parana, and by creating
obstacle in that river forms the celebrated cataract of La Guayra or S
Quedas. The altitude of these ranges nowhere exceeds 1,400 feet, b
with the numerous spurs which spread from them, the whole surface
the country presents a continuance of undulations watered by innumeral
rivulets and streams which in some places expand into swamps.

The hillsides and the great plains that they surmount are covered w
majestic forests, interspersed with rich alluvial tracts, forming magnific
pasture lands for large herds of horned cattle, and offering vast areas
fertile soil for the cultivation of many of the most valuable products of t
tropical and temperate zones. The Chaco, or Western Paraguay, has o
been partially explored, and would appear to be an immense and fert
plain, with very few elevations, and large areas subject to frequent inund
tions. The great rivers Parana and Paraguay are the principal features in t
hydrography of the country. They both rise in Brazil, and for a consid
able distance flow in parallel courses from north to south on either side
Paraguay proper. The Parana is by far the larger, but is only navigab
for a distance of 250 miles, while the Paraguay is accessible to vessels
light draught to a point 1,200 miles from the sea. The Paraguay receiv
numerous tributaries, the principal on the left bank being the Apa, Aq
daban, Ipané, and Tebicuari, which are useful for the transport of for
produce by boat and rafts, from short distances in the interior. The
on the right bank are the Rio Verde, Araguay, Confuso and Pilcomayo.

Climate of Paraguay.—The climate is hot and dry, but the wint
which are very variable have a great effect on the temperature. Fro

e south and south-west they are cool and refreshing, and the most trying e those from the north and north-east. In summer the temperature some- nes rises to 100° F., but seldom exceeds it, and the mean is 85° to '. In winter, that is to say from May to August, the mean is 62° to 65°, d sometimes it falls as low as 40°. Throughout the year, some sort of vering is required during the night, and in winter a thick blanket is ry necessary. There is no fixed rainy season, but the fall is greater ring the summer months, September to April, than in the winter, and ers the great advantage of neutralising the effects of the rapid evapo- ion produced by the rays of the sun in the hottest period of the year.

Flora and Fauna of Paraguay.—The country is so highly favoured nature, and its innate resources are so great that when for some enty-six years it remained under the remarkable tyranny of the dictator, . Francia, and was prohibited from holding intercourse with other ions, it was not only self-supporting, but actually accumulated wealth. vast forests furnish timber in infinite variety adapted for all pur- ses, and unrivalled for elasticity, hardness and durability; textile and dicinal plants grow spontaneously; dye-woods, gums, cotton, indigo d india-rubber are found in their natural state; and groves of orange es yield fruit unsurpassable in size and flavour; while wherever culti- ion is attempted sugar-cane, tobacco, rice, mandioca, maize and many ier products are raised in profusion. Yerba-maté (*Ilex Paraguaiensis*), Paraguay tea, is a natural product of the soil, and is extensively consumed roughout South America. The gathering employs a large number of ourers, and the export tax placed upon it, adds considerably to the venue of the State.

Animal life is abundant. Of wild animals, the jaguar, puma, tapir and elot are the most formidable, and deer of several species, wild boars d peccaries, the more numerous. The woods are full of monkeys; and ere are said to be upwards of 450 distinct species of birds, the largest of ich is the rhea, or American ostrich, and the smallest the viudita, a le parrot about the size of a canary. Brilliant macaws and jays, toucans th their enormous beaks, wild turkeys, and several distinct species of rtridge are common. Alligators and carpinchos bask in the sun on e banks of the rivers and lakes, and fish of many kinds swarm in the ters. Snakes are both numerous and venomous. A remarkable feature the inland waters is the existence of enormous water-serpents, which ve been known to upset canoes, and drag the occupants below the face.

The mineral resources of the country have never been carefully examined. little gold is found, probably washed down from the province of Matto osso, in Brazil; but copper occurs in some places, and iron and man- nese are spread over large areas.

People and History.—The indigenous inhabitants were tribes of the despread Guarani nation, and were conquered in 1536 by a Spanish

expedition under the command of Juan de Ayolas, a lieutenant of Seba tian Cabot. Two remarkable incidents in the history of the republic ha

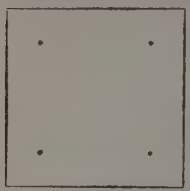

FIG 417.—*Average population of a square mile of Paraguay.*

attracted world-wide attention; the domination of t Jesuits (1609–1767), and the long dictatorship of Gasp de Francia (1816–1840). In 1865 a disastrous w was commenced with the allied forces of Brazil, t Argentine Republic, and Uruguay, which brought t country to the verge of ruin, and only terminated 1870. The present form of Government is that of democratic republic ruled by a President who elected for four years, and a Congress consisting of Senate and Chamber of Deputies elected by univers suffrage. The religion of the State is Roman Catholic, but all forms worship are tolerated. Education is free and compulsory.

Trade and Towns.—The principal industries are the distillation spirits from sugar-cane; the fabrication of liqueurs, essences, oils, soa and tans; the manufacture of cigars, earthenware, bricks and furnitur and the raising of herds of cattle. Hides, both green and dried, horn bones and horse-hair are largely exported, and also tobacco, orang timber barks and yerba-maté, but the greater part of the products a introduced to the European markets as proceeding from the River Pla *Asuncion*, the capital, is extremely well situated on the left bank of t Paraguay, which at this point is a thousand yards broad, in latitude 2 S. Other towns of lesser importance are *Villa Rica*, *Villa Concepcion* a *Villa del Pilar*. The total population, exclusive of the Indians of the Cha is 450,000. There is a regular service of steam vessels between the po of the River Plate and Asuncion, and communications with the interi are maintained by means of the rivers, and by several good trunk-road There is also a railway 150 miles in length connecting Asuncion and Vi Rica, the second town of the Republic, and then diverging in a souther direction towards the Parana with a view to its ultimately joining t Argentine railway system.

STATISTICS (*Estimates*).

Area of Paraguay in square miles	140,000
Population	450,000
Density of population per square mile	3·2
Population of Asuncion	45,000
„ Villa Rica	19,000

ANNUAL TRADE (*in* 1896).

Imports, £492,000. Exports, £454,000.

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IV.—THE FALKLAND ISLANDS

By the Editor.[1]

Position and Physical Features.—The Falkland Islands rise on
margin of the continental shelf of South America, east of the Strait of
agellan, between 51° and 53° S., and 480 miles north east of Cape Horn.
The coasts are generally low and very much indented, especially on the
ter sides of the principal islands where
ey are broken up into a number of
gged peninsulas, separating deep arms
the sea. East Falkland is almost cut in
o by opposite gulfs, the connecting
hmus being only four or five miles wide.
e surface is wild, rugged, in parts hilly,
even mountainous, rising in Mount
lam on West Falkland to over 2,300 feet.
artz rock predominates in the higher
rts, and clay slate in the lower, and
ong the geological puzzles of the islands
"stone rivers," lines of broken stones
ich in the course of time gradually make their way down hill without
aid of water. Peat is abundant and furnishes fuel. There are no
es, shrubs being the largest form of vegetation. Tussac grass growing
clumps to a height of six or seven feet, forms the characteristic feature
the flora, still abundant in the islets, though in the larger islands it has
most disappeared. There are extensive tracts of moorland, on which a
ecies of cowberry takes the place of heather; grain and vegetables are
arcely cultivable. The only indigenous four-footed animal is a species
fox. Cattle, horses and sheep have been introduced. The last are now
ured in large numbers, and constitute the chief wealth of the colony.
nguins and other sea-fowl are very numerous, and
h abound off the coasts.

FIG. 418.—*The Falkland Islands.*

The climate, although not cold, is raw, and the
mmers are not genial. The mean annual temperature
about 42°, and often lower, with a mean range between
° and 65°; the rainfall does not exceed 30 inches
nually, but rain falls on two days out of every three
d mist frequently prevails. Strong gales often occur.

FIG. 419.—*Badge of the Falkland Islands.*

History and Government.—The islands were
scovered by Davis in 1592, but it was not until the latter part of the
ghteenth century that any attempt was made at colonisation. French,
uniards and English successively essayed to form settlements, and the
nds were seized now by one, now by another of the rival Powers. At

[1] Assisted by E. J. Hastings.

last, in 1833, they were permanently taken possession of by the Briti Government for the protection of the whale and seal fishery in t Southern Ocean, and they were for some time used as a convict static The Government is that of a Crown Colony. The inhabitants are almo entirely of European origin. The principal means of intercommunicati is by water, for which the peninsular character of the islands affords gre facilities. The islands are mainly of importance as a station for refitti and provisioning ships on the boisterous passage round Cape Hor Sheep farming is the only important industry, and furnishes the stap export—wool, that of frozen mutton is increasing; the minor expor hides, tallow, &c., are derived from the same source. Trade, which is the hands of one company, is almost exclusively with the United Kingdo

Stanley, the capital, seat of government, and only town, is situated or nearly land-locked harbour on the north-east of East Falkland. The are facilities for repairing vessels. *Port Darwin*, a village on Darw Harbour, at the head of Choiseul Sound, commemorates in its name t visit of Darwin, during the voyage of the *Beagle* in 1833.

South Georgia, an inhospitable and generally ice-bound land, with permanent inhabitants, is a distant dependency of the Falkland Islan It was discovered in 1675 by a French navigator, La Roche, and exac 100 years later was taken possession of for the British crown, and nam after the king. A German astronomical expedition visited it in 1882 observe the transit of Venus, and remained till the following year.

STATISTICS.

	1881.	1891.	1901.
Area of Falkland Islands in square miles	6,500	6,500	6,500
Population of Falkland Islands	1,414	1,789	2,043
Density of population per square mile	0·2	0·3	0·3
Population of Stanley	700	694	916

CHAPTER XLVI.—THE UNITED STATES OF BRAZIL

By J. Batalha-Reis.

Name, Position and Extent.—The word Brazil comes from *brasil*, *il*, or *verzino*, the name of a dye-wood used in Europe in the Middle es, and applied to another dye-wood found in the American forests. e United States of Brazil occupy about one-half of South America, and end across seven-eighths of its greatest breadth. The country is nty-seven times as large as the United Kingdom, and larger than all tralia or the whole of Europe. It lies almost entirely between the ics, and is crossed by the equator. Brazil and the territories included the Plata-Paraguay, as shown in the accompanying maps, reproduce ctly the outline of the whole continent.

Orography and Hydrography.—Brazil is made up of highlands upying 700,000 square es, and forming an land," as it were, sur- nded on the north- and east by the ntic Ocean, and on north-west and west he continuous valleys rivers, the Amazon- leira-Guaporé, and Paraguay-Parana- a; and by lowlands prising a large part these valleys (the azon basin having an of 1,900,000 square es), including the hern slopes of the ana Mountains. The

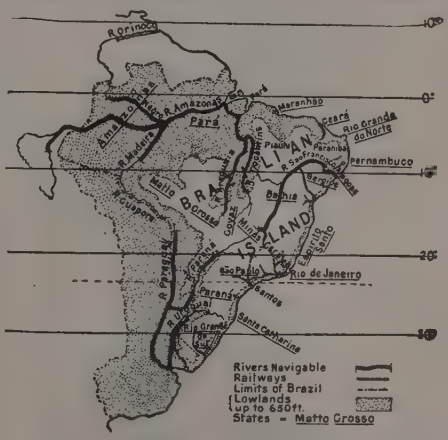

FIG. 420.—*Configuration and Hydrography of Brazil.*

bour of Rio de Janeiro, in the middle of the Atlantic coast of the zilian "Island," is the centre of a real mountainous region, the highest of which, probably the highest of Brazil, the Itatiaia (Mantiqueira), is er 10,000 feet. This region is the last remnant of a colossal moun- mass, the worn-down fragments of which have formed the sur- nding lands. The highlands grouped as water-partings, either stretching

parallel to and along the sea-coasts, or diverging towards the interi
may be considered as forming three connected systems, the names
which often correctly characterise their geographical functions :—

(1) The Sea Mountains (*Serras do Mar*) or General Range (*Serra Ger*
form the south-eastern slopes of the great plateau of the Brazilian Islar
towards a strip of lowland along the Atlantic. (2) The Backbo
(*Espinhaço*), or Axis (*Espigão*), or *Serra Central*, is an extension of t
Mantiqueira, and therefore of the maritime highlands southward towar
the Uruguay, and northward in the basin of the São Francisco, which
separates from the rivers flowing more directly into the Atlantic. (3) T
Water-partings (*Vertentes*) between north and south separate the basin of t
Amazon-Tocantins and São Francisco in the north, and that of the Pla
Parana-Paraguay in the south. From these central highlands of t
"Brazilian Island" the streams run into the deep surrounding valleys.
the north and north-east the rivers Tocantins-Araguaya, Xingu, Tapajoz, a

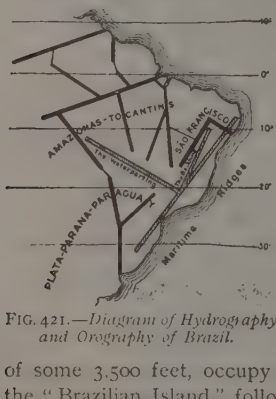

FIG. 421.—*Diagram of Hydrography and Orography of Brazil.*

Madeira flow to the Amazon; on the sou
west and south the river Guaporé flows
the Amazon, and the system of the Paran
Paraguay-Uruguay to the Plata. The nor
and north-east are partially drained by t
São Francisco flowing to the Atlantic. T
ancient mountainous cordillera is now wo
down as the result of ages of denudati
into vast plateaux, extensive elevated plai
(called variously *Chapadões, Taboleiros, Ca
pos, Geraes*), the more resistant parts
which project as sharp hills rather th
real mountain ranges. The States of Min
Geraes and Goyaz, with a general altitu
of some 3,500 feet, occupy the most elevated plateaux in the centre
the "Brazilian Island," followed westward by the Matto Grosso plateau
averaging 2,500 feet and more, and in the extreme north-east by the lan
draining directly northward to the sea which, from the upper Maranh
to Piauhy and Pernambuco, sometimes reach elevations of 4,000 and 5,0
feet. From the eastern slopes of the "Brazilian Island," south of t
mouth of the São Francisco, shorter streams run straight to the Atlantic.

Running from the Colombian Andes and the highlands of Venezue
and Guiana, the waters, in the northern part of the immense Amazon valle
gather into the rivers Iça, Japurá, Negro-Branco, Jamundá, Trombeta
and Jari. North of the mouth of the Amazon in the northernmost e
tremity of Brazil the Oyapok, Cassiporé, and other rivers run from t
slopes of French Guiana to the sea. The highest valleys of the Guapo
and the Jaurú-Paraguay, with hardly four miles between, are often e
tirely covered by the same floods; the Amazon is actually united to t
Orinoco by the Rio Negro, through the Cassiquiare, to the Essequibo

Trombetas ; and the Tocantins is in permanent communication with São Francisco by the Somno-Sapão. More than half of the surface Brazil belongs to the Amazon-Tocantins basin ; about one-quarter to of the Parana-Paraguay ; and the other quarter to the São Francisco the shorter Atlantic rivers.

Geology and Minerals.—Two elliptical zones of Primary (Archæan-ozoic) rocks, which are in juxtaposition from north to south, are ident from east to west, along the central region of the water-parting veen the Amazon and Plata basins, forming, indeed, the central moun-ous district of Rio de Janeiro, São Paulo, Minas Geraes, Goyaz, and to Grosso. These Primary zones surround respectively two central ses of Mesozoic lands. The northerly Primary zone is itself half reled on the north and east by a long strip of Tertiary forma-s, intersected by Secondary s, north of which again nary rocks form the slopes Guiana, apparently separated n those of the "Brazilian nd" by the Tertiary and ternary deposits of the zon valley. The Paraguay-na basin and several smaller ys are also covered with ternary sediments. In the ral part of the Archæan for-on, from the upper valley of São Francisco to the sea, the and diamonds which once e Brazil famous were found *situ*. But both gold and nonds were at first, and are worked mainly in alluvial s, principally in the vast region which has its centre in the district of s Geraes (*i.e.*, many mines), but which also stretches northwards to ia, westwards to Goyaz and Matto Grosso, and southwards as far as Grande do Sul. In the same localities mercury, copper, zinc and ganese ores are found, and also the topaz, amethyst, tourmaline, beryl, e and other precious stones, but never real emeralds. Large deposits on have been found, especially in Minas Geraes and São Paulo. Coal seems to be abundant in the Carboniferous strata of São Paulo, Santa arina, and Rio Grande do Sul. Lignite exists in the Tertiary forma-of the Amazon, Minas Geraes, and the east coast. The decomposi-of the crystalline rocks (diorite, diabase, gabbro, melaphyre) uces red soil (*terra roxa* or *Massapé*) celebrated for its immense ity.

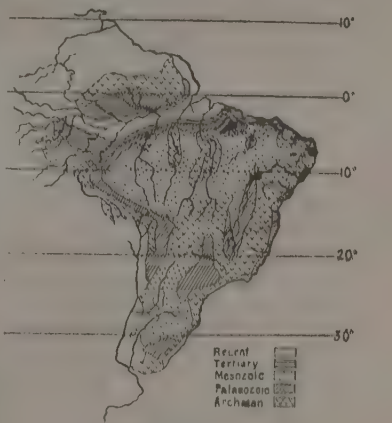

FIG. 422.—*Geology of Brazil.*

Climate, Flora and Fauna.—With the exception of the th smaller southern States (Parana, Santa Catharina and Rio Grande do S the whole of Brazil, ranging from 5° N. to 33° S., is included in tropics: the vast region of the north in the great central valley of Amazon lies right under the equator. Hence the climate is alm everywhere of the characteristic tropical type, except as modified altitude. The combined influence of high temperature and cons moisture (the rainfall of the Amazon basin is excessive) produces exten and complex tropical forests. These find their chief development in t regions—(*a*) In the vast Amazon valley surrounding the north and no west of the "Brazilian Island" (called *Selvas* or *Hylæa*), where palm-t (*Igapó*) grow from 60 to more than 200 feet high, often rooted ben floods 60 feet deep. Amongst the characteristic species are the Maur Copernicia, or wax-palm, Hevea, Hancornia, Micrandra yielding rub Cacao, and the Bertholletia giving Brazil nuts. (*b*) On the Guiana slo (*c*) On the banks of the deep valleys of the affluents of the Amazon, eve

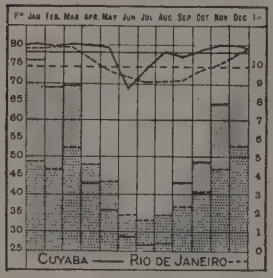

FIG. 423.—*Rainfall and Temperature in Brazil.*

the heart of the "Brazilian Island," in upper course of the Parana, and in entire valley of the São Francisco. (*d*) the Serras do Mar (*Mattas virgens*) wh amongst other species, Ipecacuanha, P carpus, Jacarandá or rose-wood, Dial ferrum, Cæsalpinia echinata giving Br dye-wood, and Araucaria flourish. eastern forests are under the influence the moisture-laden easterly trade wi wherever they blow perpendicularly to coast, the prevailing directions being f south-east in the north, east in the cen and north-east in the south. The de forests of the great valleys are interrupted in certain parts of the Ama valleys by savannas. The highlands of the interior of the "Brazilian Islan in Minas Geraes, São Paulo, Goyaz, and Matto Grosso have a less m climate, and are covered with shrubs, arboreal cacti and grasses, intersec by subtropical forests. At the north-eastern extremity, in Ceará and Grande do Norte, where the trade winds blow parallel to the coast especially dry season occurs periodically from June to December ev ten years. In the forests of the flooded valleys, plants, submerged at base and mutually shaded, become creepers and epiphytes in order reach the light of the Sun.

The animals are also often modified for climbing or aquatic hab Many species of monkeys, sloths, reptiles, humming birds and parrots typical forms. The peccary, agouti, tapir, armadillo, paca, puma, co and the rhea, or American ostrich, are all characteristic of Brazil.

Aboriginal Peoples.—The tribes found by the European

erers, and still in existence, although all belonging to the American dian" stock, seem to have come from several different centres. r great migrations have already been determined, one from the h, two from the south, and one from the east. The first line of ration was from north to south and south-west, by which the Aruaks (Maipure and Ipurina) came from the West Indies to the ey of the Amazon, diverging south-westwards to the rivers Japurá, á, and Purus, and continuing southwards to the Paraguay. The Tupis Guaranis moved from south to north and north-east from the Paraguay ne Atlantic, along the coast, and also gained the valley of the Amazon Guiana by passing down the valleys of the Xingu and Tapajoz. The nd migration from the south was that of the Caribs (Carahibs), who e northward and north-westward to the valleys of the Amazon urá) and to Guiana. From the east the Gés (Aimorés, Acroá, Caiapó, Botocudos in part) moved westward from the eastern half of Brazil from the Maranhão to the Xingu, penetrated southward to Rio nde do Sul. Many other tribes are only known by their more local ements, the chief amongst them being the Goitaca or Vaitaca, who rated from northern Parahiba to the Rio Doce and Minas Geraes, and many peoples of the interior of the Amazon valleys, such as the nyas, Panos, Caraya, and Guayacuru. The Gés seem to have been laced by the migration of the Tupi, who formed most of the tribes d by the Portuguese explorers, and the Jesuit missionaries tried to oduce the Tupi dialect as a general Brazilian language. Some of the i and other Indians were at first forced to work as slaves for the uering Europeans, but were afterwards liberated, and in many places have been from time to time collected in settlements or villages to be ated. Their place as labourers has been taken since 1549 by African oes, who were introduced as slaves.

Present Population.—After four centuries of contact with European African races the best known inhabitants of Brazil seem to exist e following relative proportions—the Europeans g for the most part of Portuguese descent.

Europeans. (more or less pure).	Negroes.	Americans. Pure (*Caboclos*).	Americans. Mixed (*Pardos*).	Total.
38	20	4	38	100

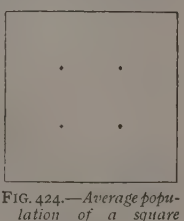

FIG. 424.—*Average population of a square mile of Brazil.*

y Indian tribes, still living in a state of native gery, have never entered the Brazilian statistics, are not taken account of. Towards the end ne sixteenth century the population of Brazil was nated at some 60,000. In 1819 the first census ved 4,000,000 inhabitants, while in 1890 the population numbered about 00,000, having thus apparently quadrupled in seventy years. The igrants, who form a great part of this increase, were principally uguese and Spanish. Italians have predominated during recent years,

and especially settled in the temperate southern States, São Paulo and de Janeiro. In the south also some German agricultural and past colonies have been established. These settlers continue to a cer extent to use their own languages; but the official language of country is Portuguese, although considerably modified.

Phases of History.—The modern history of Brazil exhibits distinct phases: (1) The struggle of the Portuguese against the Fre and Dutch for the possession of the newly discovered land; (2) struggle with the South American Spaniards, and the question of bo daries; (3) the internal dissensions due to trouble with the Indians a Jesuits; (4) geographical and economical exploration and the questio slavery; (5) the growth of the provinces into the present quasi-autonom States; and (6) Brazilian nationality and independence.

Discovery.—The northern coasts of what is now called Brazil w seen in January, 1500, by an expedition of Vicente Janez Pinzon, a had probably been sighted by other Europeans half a century or m earlier. The centre of what the Portuguese first called the "Land of True Cross" (*Vera Cruz*), and afterwards, probably since 1503, "Braz was visited by Pedro Alvares Cabral in 1500 at Cabralia Bay in the so of the State of Bahia, which thus became the starting-point of Portugu exploration and colonisation. By 1505 the whole coast from Maranh to the Plata had been generally reconnoitred, and during the next f years many Portuguese settled in different parts of the new land a married Indian women. From 1532 to 1535 Brazil, then extending fr the equator to 30° S., was divided into twelve parallel districts, ea running due west from the Atlantic, but with unequal length of coast a indefinite hinterlands. These were called "Captaincies," and granted sovereign fiefs to independent captains; more were subsequently creat but in the middle of the eighteenth century they all reverted to t Portuguese Crown.

Settlement and Exploration.—Two great centres of explorati were formed in course of time, Bahia in the north between 10° and 15° and São Vicente (afterwards São Paulo) in the south, between 23° and 25° In the coast regions of the northern division, including Bahia, Pernambu and Maranhão, which were the first discovered and the most intens colonised up to 1680, the climate was hostile to the establishment Europeans, and demanded the cultivation of tropical products. Plan tions of sugar-cane, introduced from Madeira in 1532, and of cotton we accordingly established. The first important Portuguese settlement w at São-Salvador-da-Bahia-de-Todos-os-Santos (All Saints' Bay), wh became the seat of the first central colonial Government in 1549. In southern division (São Paulo and Rio de Janeiro), the white population t kindly to the new soil. The more temperate climate allowed all sort crops to be cultivated; and mines were discovered by the active explo tion of the interior. A national Brazilian character was naturally for

ese more favourable surroundings, and the centre of administration economical activity was shifted in 1762 from Bahia to Rio de Janeiro. n the very first years of the discovery the Portuguese had to fight r European nations for the possession of Brazil. In 1504 the French menced to trade to Brazil for dye-wood; subsequently they built forts established a colony, but they were finally expelled in 1615. The ch made their first hostile appearance at the end of the sixteenth ury. They afterwards took Bahia, and established themselves on the t between the São Francisco and the Rio Grande do Norte; but in the Portuguese finally expelled them from Brazil. In 1640, at the when Portugal ceased to be part of the dual Spanish Monarchy, il was divided into two States and created a kingdom, united to ugal and governed by a Viceroy. The interior had been already ored in many directions in the search for gold and emeralds, and for purpose of procuring forced labour. In 1539-40 Orellana navigated Amazon, in its most important branch, from Peru to Pará; and a century its central course was again entirely visited by Pedro Teixeira. At the of the sixteenth century the exploration of the São Francisco valley commenced, and fifty years later the colonists of São Paulo reached hern Paraguay, and thence the high Andes of Bolivia, afterwards oring Matto Grosso, Goyaz and Minas Geraes. From the end of the nteenth and during the whole eighteenth century the exploration of basin of the Amazon was actively continued. Of the more recent orers in Brazil it is impossible even to record the names and dates; numerous as they were, and energetically as their explorations were ied on, great tracts of land still remain quite unknown.

Native Problems and Slavery.—In 1549 the Jesuits entered il as missionaries, catechising the Indians, in many cases succeeding collecting and fixing them in villages, opposing their employment their subjugation to a formal state of slavery by the Portuguese nists, but making them work for the benefit of their Jesuit churches establishments. A long and terrible struggle was the inevitable lt of this situation, and the Jesuits, who often allied themselves the Spanish settlers of the south and west, were expelled from southern province of Brazil in 1640 by the Portuguese colonists. They rned more than once until they were officially banished in 1759. The avement of the Indians was condemned by a Papal Bull in 1640, and lished by law in 1680. Negro slaves from Africa, who had been loyed ever since the middle of the sixteenth century, had, in the mean-, become very numerous. The struggles with the Jesuits led to wars the Spanish colonies and States surrounding the south and west of il, which lasted during the whole of the eighteenth, and part of the teenth century, often modifying the southern frontiers. The "Colonia acramento" (founded by the Portuguese in 1680), which had grown e the State of the "Banda Oriental," or Uruguay, became in 1821 the

"Cisplatine province" of Brazil, coveted by the Argentine Republic, was between the two nations led to the ultimate independence of Uruguay (1825–28). The war between Brazil and Paraguay (1864–70) was the last episode of the great historical struggle. In 1850 the slave trade was prohibited. Between 1871, when there were 1,800,000 slaves, and 1887, when there were only 723,000, slavery was gradually but totally abolished. The ports of Brazil were in 1808 opened to foreign trade. Half a century later the navigation of the great affluents of the Plata, in 1866 that of the Amazon, the following year that of the São Francisco (up to Penedo) was declared free to all nations. The constitution of the republic and a law of 1892 reserved coasting and trade between Brazilian ports for Brazilian ships.

Independence.—From the middle of the seventeenth century movements toward independence can be traced in Brazil. In 1808 Queen D. Maria I., then insane, and her son, the Regent, transferred the Portuguese court from Lisbon to Rio de Janeiro, and remained in Brazil during the French occupation and the revolution which established parliamentary institutions in Portugal. On returning to Europe in 1821, King Dom João VI. left his son Dom Pedro as Regent of Brazil. But in 1822 the Brazilian Empire was established, and Dom Pedro proclaimed Emperor with a parliamentary constitution. In 1831 he abdicated, and his son Dom Pedro II. succeeded and reigned until 1889, when the present republic of the United States of Brazil was proclaimed, each province becoming a State under a constitution which follows the type of that of the United States of America.

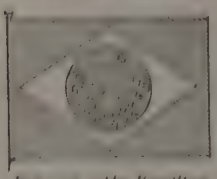

FIG. 405.—*The Brazilian Flag.*

Resources and Trade.—Even in the sixteenth century a current rumour pointed to the existence of a golden realm (*El Dorado*) in the Guiana mountains. Gold was, however, first discovered in São Paulo in 1696. Up to the middle of the eighteenth century gold and diamonds were found and worked in the province of "Minas," which was named from the fact. Coffee was introduced in the plantations of Rio de Janeiro and the south of São Paulo in 1760. From the remarkable prosperity of the crop Rio de Janeiro became the economic centre of Brazil, and now coffee is the staple production of the country as far as export is concerned, the railway system having been largely developed in order to provide communication between the plantations and the seaports. India-rubber, collected on the Amazon from wild trees, is also of great importance. The trade of Brazil is mainly carried on with the United Kingdom, the United States, Portugal, Germany and France. Most imports are subject to a very high tariff.

Natural Regions and Political Divisions.—The twenty States or provinces of Brazil correspond to a great extent with the

s, and can easily be considered in six natural groups : (i) The valley river Amazon is now divided into two States, the lower part form- ará, the upper Amazonas. (ii) South of these the lands which slope m the Amazon plain to the plateau, forming all the vast western land, belong to the State of Matto Grosso, and the heart and hydro- ic centre of the "Brazilian Island" is the State of Goyaz. (iii) Along rth-eastern coast and stretching inland from it the comparatively States of Maranhão (part of which is a continuation of the Amazon Tocantins plain), Piauhi, Ceará, Rio Grande do Norte, Parahiba, mbuco, Alagoas, and Sergipe, succeed one another from north-west th-east. (iv) The two large central States of Bahia and Minas Geraes y the valley of the São Francisco and other rivers draining to the ic. In these the mining and industrial activity of historical and rn Brazil has been to a great extent concentrated. (v) The small of Espirito Santo and the State and Federal District of Rio de Janeiro ring the coast just within the tropic, form the political centre of , and a sort of transition to the more temperate climates and the European population of part of São Paulo and the whole group of uthern States, Parana, Santa Catharina, and Rio Grande do Sul.

mazonian States.—The vast inland plain, all nearly on the same as the central part of the Amazon valley between the rivers Branco Madeira, forms the State of (1) **Amazonas,** a region of dense tropical s, thinly peopled by uncivilised Indians. It is like a palmately or tely-veined leaf, its principal ribs, besides the central course of the on, being the rivers Negro on the north and Madeira on the south, hich secondary tributaries, themselves great rivers, are pinnately ed. *Manaos*, near the confluence of all the converging waters, is the l of the State, and the natural hydrographic and economic centre immense region, which can be traversed only by its waterways. ers run on the main rivers, and native canoes follow the smallest hes. The valley of the Trombetas on the north and that of the oz on the south, divide the State of (2) **Pará,** which occupies about ird of the whole valley of the Amazon. The highlands project from sides and constrict the valley between Obidos and Santarem at the rn extremity of the State. The capital, *Belem* or Pará, seventy miles t from the Atlantic, stands on the right bank of the Tocantins. This s in direct communication with the great stream of the Amazon proper, ally forms part of its system, being only divided from it by some s, the largest of which is Marajó. The mouth of the river Pará or Tocantins has been, up to the present, the real maritime and com- l entrance of the Amazon, Belem being therefore the exporting for the rubber, vanilla and other products of both the Amazonian

ntral States.—The State of (3) **Matto Grosso** occupies the slopes lead from the low valley of the Amazon to the plateau of the

"Brazilian Island," and the whole western part of the latter, with a m
altitude of 3,000 feet. It occupies nearly one-half of the total width of Br
from Bolivia to the river Araguaya, and more than one-half of its len
from the middle Tapajoz and Xingu to the middle Parana at the repu
of Paraguay. This State is almost without inhabitants, and much of
still unexplored. The capital, *Cuyabá*, and some few settlements, are on
rivers of the Paraguay hydrographic system, therefore the principal c
mercial outlet is naturally towards the Plata. The State of (4) **Go**
is almost exclusively formed by the great valleys of the rivers Tocan
and Araguaya, south of their confluence, stretching for 15° of latitude f
north to south through the water-parting (*Vertentes*) in the Santa Ma
and Pyrence ranges (which reach 4,500 feet), down to the northern
branch of the hydrographic system of the Parana. Goyaz is not so de
of population as Matto Grosso. The capital, *Goyaz* (formerly Villa F
is very remotely situated in the central region whence the waters
to the Amazon and to the Plata.

North-Eastern Littoral States.—In the extreme north-east
Parnahiba, which carries the greatest volume of water of any river betw
the valleys of the São Francisco and the Tocantins, forms the eas
border of the State of (5) **Maranhão,** the littoral of which is a conti
tion of the Amazon forest zone. The higher lands form savannas, wit
average height of 800 feet, which are continuous on the west with thos
Pará. The capital, *São Luiz,* is on an island in São Marcos Bay, at
common mouth of numerous rivers which drain the whole State from s
to north, and form, on approaching the sea, a large, low and swa
region, edged by many small islands. The eastern half of the basin of
Parnahiba forms the State of (6) **Piauhi,** which has a coast-line of
eighteen miles, scarcely more than part of the mouth of the river, but expa
broadly to 380 miles towards the south. It is covered with forests in
lowlands and with shrubby catingas on the higher lands; and is
thinly peopled. *Therezina,* the capital, was established far inland wh
the Poti, the most important tributary, coming from the north-east en
the Parnahiba. The State of (7) **Ceará**, on the east, occupies the basi
the Jaguaribe, and has a long coast-line on the Atlantic with few harbo
At *Fortaleza* (or Ceará), the capital, cargo has to be landed in surf-boat
the beach. The State of (8) **Rio Grande do Norte** in the north-eas
angle of Brazil includes Cape São Roque, and occupies the valley of
lower Piranhas and other streams. Its capital is the small port of *Na*
The State of (9) **Parahiba do Norte** follows to the south, occupying
valleys of the upper Piranhas, Parahiba and other streams. The t
States last named are alike in sharing a low forest-clad coastal plain wh
rises to a mountainous region of savanna character where they meet
the watershed in the interior. The important State of (10) **Pernambu**
with over a million inhabitants, covers the space between the eas
curve of the São Francisco and the north-eastern highlands of Br

capital, Pernambuco or *Recife* (named from the reef which guards its bour), in front of Olinda, at the mouth of the Capiberibe, is a sea- doing a large trade, and the centre from which a fairly complete way system penetrates the State and brings down the produce of nerous rich plantations of sugar and cotton. The interior land is ned by savannas, with a mean elevation of between 1,500 and 2,000 feet, tropical forests clothe the eastern slopes. The island of Fernando de ronha, which lies 340 miles off the coast to the north-east, and is used convict station, is officially a part of this State. The last two littoral es of the north-eastern group are very small and lie one on either side he lower São Francisco. They are (11) **Alagoas** on the north, and **Sergipe** on the south, the smallest in all Brazil.

Central Eastern States.—In the very centre of the eastern zone of "Brazilian Island," and both limited to the west by the elongated region Goyaz, the two great States of Bahia and Minas Geraes occupy succes- sections of the wide valley of the São Francisco, and of the eastward be of its eastern watershed. The State of (13) **Bahia** may be divided two different regions—(*a*) the middle and northern part of the São ncisco valley and (*b*) the valleys of the littoral rivers Itapicuru, aguassu, Contas and Pardo. Its capital São Salvador da Bahia, or ply *Bahia*, which was the first capital of colonial Brazil, lies on the th-eastern side of the vast Bay of All Saints. It is the second harbour Brazil, and continues to be one of the most important towns, and the dence of the Roman Catholic Primate. The lands around the bay, iched by the *massapé* soil, are of extreme fertility and covered with ntations of sugar-cane, tobacco and other products. The most ulous State in Brazil is (14) **Minas Geraes,** which lies entirely inland, l is penetrated only on its margins by railways from the seaports of Rio Janeiro and São Paulo. It is formed of three different regions—(*a*) the her basin of the São Francisco and Parnahiba with its mountainous rders rising to elevations of from 3,000 to 5,000 feet; (*b*) the higher leys of the Jequitinhonha and Doce which rise in the Espinhaço and w eastward to the Atlantic; and (*c*) the valleys of the higher Rio Grande- rana. This State is the richest part of Brazil as regards mineral ources. *Ouro Preto*, which succeeded the old and rich centre of mining zil, *Villa Rica*, is still its principal town; but the official capital of the te was recently removed to *Bello Horizonte*. Plantations in the south, cattle-breeding, have more recently acquired importance.

South-Eastern States.—The littoral of Minas Geraes, between the ra do Mar and the sea, forms the small State of (15) **Espirito Santo.** the south of it follows the very small State of (16) **Rio de Janeiro.** ned by the highest mountains of Brazil at an angle where the coast is from a southerly to a south-westerly trend. It is the most densely- pled of the Brazilian States, and the best served by railways. The tal is *Petropolis* on the mountainous district. On the grand bay of Rio

de Janeiro, facing *Nictheroy*, is the largest city of South America, Sã Sebastião do Rio de Janeiro, familiarly known as *Rio*. Surrounded b

FIG. 426.—*The Bay of Rio de Janeiro.*

the (17) **Federal District** under the direc administration of the central national goverr ment, it has been the capital of imperial an is now that of republican Brazil as it was the old Portuguese colony. The city possesse one of the finest botanic gardens in the worl and an observatory. It is famous for its ga dens and tree-planted avenues, but is neve theless unhealthy. As a harbour the bay Rio de Janeiro is only to be compared wit Port Jackson, which it surpasses in the gran deur of its mountain scenery. It is th chief emporium of Brazil, carrying on great trade with all parts of the world.

South of Minas Geraes and Rio de Janeiro the long rectangle betwee the Atlantic and the river Paraná is divided by some of the affluents of th latter into four parallel zones, forming as many States, which have a sho steep versant to the Atlantic, and slope gently inland to the great rive The most northerly touching Minas Geraes, Rio de Janeiro, and Matt Grosso, and for the most part within the tropics, is the State of (18) **São Paulo.** It consists of two parts—(*a*) the basin of the Paraná between i two branches Rio Grande and Paranapanema; (*b*) part of the centra mountainous region where Mantiqueira reaches 5,462 feet, and of th Serras do Mar and the adjacent littoral. Through the very centre of th State flows the Tieté, carrying the collected waters to the Paraná. Th population is concentrated in the east where the principal port is *Santo* The capital, *São Paulo*, in the interior, stands at an altitude of 2,390 fee Numerous islands lie along the coast. The State is one of the most ente prising and progressive in Brazil, with a great production of coffee, an well served by railways in the eastern half. Italians preponderate no amongst the immigrants.

Southern States.—South of São Paulo, between the Itararé-Paran panema and Rio Negro-Iguassú, is the State of (19) **Paraná.** Th harbour of *Paranaguá* is the chief commercial town, exporting th products of the State, amongst which Yerba-maté (Paraguay tea) is im portant. The State of (20) **Santa Catharina** stretches from west to eas between the rivers Iguassú and Uruguay, to the Argentine territory o Missiones. The capital is *Florianopolis* (*Desterro*), on the island of Sant Catharina. The chief resources of the State are plantation products in th east, and cattle in the west. There are many groups of German an Italian colonists. Last, between the river Uruguay and the republic o that name, and forming the north part of a sort of peninsula between th Pelotas-Uruguay-Plata and the sea, comes the most southerly State, whic

ms to be only attached to the rest of Brazil by the Serra do Mar as by arrow isthmus. This is (21) **Rio Grande do Sul** (or São Pedro do o Grande do Sul), drained by the river Ibicui, which belongs to the uguay system, and by the Jacacahi-Jacuhi flowing to the great lake of tos, a littoral lagoon, at the northern end of which, *Porto Alegre*, the pital, is established. At the mouth of the lagoon, in the south, *Rio Grande Sul* is an important seaport. Another lagoon, Lake Mirim, also stretches ng the Atlantic. Like the other southern States it prospers by cattle-sing on its extensive pastures. There are many German settlers.

STATISTICS.

	1890.
Area of Brazil in square miles	3,209,878
Population of Brazil	14,332,530
Density of population per square mile	4·5

THE STATES OF BRAZIL IN 1890.[1]

State.	Area in square miles.	Population.	Density of Population.
Amazonas	732,500	148,000	0·2
Matto Grosso	532,700	93,000	0·2
Pará	443,600	327,000	0·7
Goyaz	288,500	227,500	0·7
Minas Geraes	222,000	3,184,000	14·3
Maranhão	177,600	431,000	2·4
Bahia	164,600	1,820,000	11·0
Piauhi	116,000	267,500	2·3
São Paulo	112,300	1,385,000	12·3
Rio Grande do Sul	91,300	897,500	9·8
Paraná	85,400	249,500	2·8
Pernambuco	49,600	1,030,000	20·7
Ceará	40,200	805,500	20·0
Parahyba	28,800	457,000	15·7
Santa Catharina	27,400	283,500	10·3
Rio de Janeiro	26,600	977,000	36·6
Alagoas	22,600	511,500	22·1
Rio Grande do Norte	22,200	268,000	12·8
Espirito Santo	17,300	136,000	7·2
Sergipe	7,370	311,000	42·2
Federal District	538	522,600	971·5

POPULATION OF THE CHIEF TOWNS.

	Estimate 1883.	1892.		Estimate 1883.	1892.
de Janeiro	350,000	522,600	Parahiba	?	40,000
hia	140,000	200,000	Maranhão	35,000	38,000
rnambuco	130,000	190,000	Ceará	?	35,000
Paulo	40,000	100,000	Pelotas	45,000	30,000
em	40,000	65,000	Ouro Preto	20,000	22,000
rto Alegre	35,000	55,000			

ANNUAL TRADE (*in pounds sterling*).

(*Largely Estimates.*)

	1871–75.	1881–85.	1891–95.
Imports	19,000,000	21,350,000	30,000,000
Exports	22,500,000	23,200,000	35,500,000

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[1] A census was taken in 1900, but the results were considered fallacious and not accepted cially.

CHAPTER XLVII.—NORTHERN SOUTH AMERIC

I.—THE COLONIES OF GUIANA

By J. Rodway,
Georgetown, Demerara.

BRITISH GUIANA

Position and Surface.—British Guiana, the only British possessi on the South American continent, lies between Dutch Guiana and Ven zuela, from which latter its line of division was settled by a tribunal arbitration in 1899. From the river Corentyne, which divides it fro Dutch Guiana, to Point Playa, which was fixed as the northern boundar the coast-line extends to a length of about 250 miles; the depth of th colony inland to the sources the Essequibo river is about 6 miles. The newly defined ar of British Guiana is shown u shaded in Fig. 427.

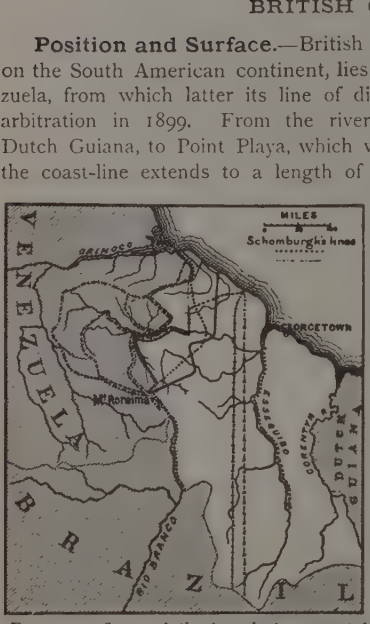

FIG. 427.—*Some of the boundaries suggested between British Guiana and Venezuela.*

For fifty miles from its fl alluvial shores the sea is di coloured by the immense volum of muddy water poured in by i rivers. Hardly rising above hig water mark, the coast for abou twenty miles inland was onc nothing more than a mangrov swamp in front and a sedgy mora behind; but this has been change to a great extent through the i genuity of the first possessors the colony, the Dutch, who, im tating the dams and dykes their mother country, succeeded in empoldering the greater part of t coast, and in laying out a line of sugar and cotton plantations. Cott has, however, long been abandoned, and sugar has probably seen its be days; nevertheless, this line of empoldered land, which rarely exten beyond five miles from the shore, is virtually the only portion of t colony under cultivation and almost the only part inhabited. Behind t depth of alluvium come reefs of white quartz sand, the sea beaches some former age, and beyond these again a rocky, hilly country cover

h primeval forest, only in the far interior broken by open savannas on andstone formation. The rocks belong to ancient igneous and sedi-ntary formations, consisting mainly of granite, quartz, and red and ite clays, in which gold is found.

Rivers and Mountains.—The longest of the rivers is the Essequebo ich rises in the extreme south almost on the equator, and, including its nerous windings, is over 600 miles long; the Corentyne is about the ne length, the Berbice 400 miles, and the Demerara 250. Other rivers are Barima, Waini, and Pomeroon, besides which there are the two great uents of the Essequebo, the Cuyuni and Masaruni as well as hundreds smaller rivers generally called creeks. The Corentyne, Berbice, merara, and Barima are navigable for over a hundred miles from their uths, but the Essequebo, Cuyuni, and Masaruni are obstructed by rapids ut fifty miles up. The joint estuary of the three last-named rivers, ich is about 20 miles broad, contains a large number of islands, the gest of which are Wakenaam, Leguan, Hog Island, and Troolie and.

There are three principal ranges of mountains in the west, the Acarai, carima or Humirida, and Canuku. The culminating point of the Paca-a is the famous Roraima, 8,740 feet in height, the upper portion of ich is an immense rock rising with precipitous sides about 1,500 feet ve the slope. Other mountains range from 3,000 to 4,000 feet l those in the Pacarima, of sandstone formation, are exceedingly turesque from the weathering of the rocks, and the number of falls and aracts on the rivers.

Climate and Vegetation.—The climate, from the position of the ony, 1° to 9° N., is naturally hot; owing to the heavy rainfall, which netimes amounts to 140 inches in a year, it is moist, and in the forest amy. Nevertheless, as there is no appearance of aridity, and as on the st there are always sea breezes to moderate the temperature, the heat is er unpleasant. The range of the thermometer is from 74° to 90° F., it more commonly remains at 80° to 82°. Unlike the West Indian nds the colony is perfectly free from hurricanes and earthquakes.

The forests, which cover the greater portion of the interior, are uliarly interesting to the naturalist from the multiform character of the etation, and the beauty and variety of the quadrupeds, birds and cts. The most interesting of the higher animals are the tapir, the es (allied to guinea-pigs), the ant bear, and the series of cats which minates in the jaguar or American tiger. Alligators and immense fish n in the rivers, and parrots, macaws, toucans and humming-birds h upon and hover about the trees. Epiphytal orchids and monster ping plants deck the branches, and on the river banks palms, tree s, and aroids decorate the foreground. From the Berbice river the e Victoria Regia water-lily was first brought to Europe, to be after-ls distributed over the whole civilised world.

People and History.—The inhabitants are varied in race as well nationality. The native Indians belong to several tribes; some of the live in much the same condition as their forefathers did when Ameri was discovered. The Africans are represented by a few thousand re Guinea negroes, and a hundred thousand born in the colony; Asia races are represented by almost as many East Indians (introduced to wo on the plantations), as there are negroes, and a number of Chinese; wh the Europeans are mainly Portuguese and British.

The colony originally consisted of two settlements on the Essequ and Berbice rivers, founded early in the seventeenth century by t Dutch, to which, in 1745, that on the Demerara was added as an offsh of the first. Essequebo and Demerara were for a long period under t control of the Dutch West India Company, which also owned Berbice, b having granted that river as a fief to another mercantile company it w quite independent. The settlements suffered much at different times fr privateers, and in 1781 they fell into the hands of the British, to be rec

FIG. 428.—*The Badge of British Guiana.*

tured, however, the following year by the Fren allies of the Dutch. They were again captured by t British in 1796, given up at the Peace of Amiens 1802, and a third time captured a few months later 1803, to be finally ceded to the British at the Pea of 1815. The colony, which was first called Briti Guiana on the union with Berbice in 1831, is admin tered by a Governor and Executive Council nom ated by the British Colonial Office; there is a legislati body of eight officials and eight electives called the Court of Policy which is adjoined to vote supplies an elected body called Financ Representatives.

Commerce and Towns.—The most important industry is the gro ing and manufacture of sugar and its by-products, rum and molass The annual export of sugar in 1896–97 was a trifle over 100,000 to There has been a considerable reduction (about 30,000 tons) in the expo during the last few years, which, together with the great lowering of val has caused much depression in the colony. Gold washing first beca one of the industries of the colony about 1880, and the exports of 18 were valued at over £400,000, but it has undergone no expansion sin Gold mining has been attempted, but hitherto without much success. appears that two zones of gold-bearing strata extend in the west of t colony from Venezuelan to Brazilian Guiana; in some places t "pay-dirt" is very rich, but on account of the long journeys in op boats, the danger of the rapids, and the drenching rains and floods, t diggings have not been fully developed.

Communication along the coast and for short distances up the princi rivers is carried on by a line of steamers; there are good roads in t inhabited districts and two short railways. It is intended to run railw

ng the whole coast line to connect with that on the east coast, and some hese extensions have already been commenced.

The colony is divided into three counties which correspond with the old lements—Essequebo, Demerara, and Berbice, and retain these names. merara, being the most important, has long been used as a general ne for the whole colony, *e.g.*, Demerara sugar, which is not simply product of one county, but of all three. A portion of Essequebo wn as the North-West District, lay within the territory disputed Venezuela, and is under separate jurisdiction. *Georgetown*, Demerara, capital of the whole colony, is situated on the right bank of the nerara at its mouth, with a second frontage on the sea, where it is ured from inundations by a stone wall over a mile long. Like the other ts of the coast it is below high-water mark, and has to be drained by als with sluices, which are opened at low water, and by steam pumps. twithstanding its flatness, the city is made beautiful by the number of ms and other trees planted in its streets and gardens, in fact when seen n the lighthouse it looks as if embosomed in a wood. The chief town Berbice is *New Amsterdam*; in Essequebo the small town of *Bartica*, oint of departure for the gold diggings, and there is the nucleus of own in the North-West District called *Morawhanna*. Villages are nerous along the coast, where they generally alternate with the ntations.

British Guiana has been called a magnificent province. Although ost as large as the United Kingdom, hardly one-hundredth part of its a has been touched, and not one-tenth of the fertile alluvium is in cul- ation. Enough sugar to supply the mother country could be easily wn; cotton, coffee, cacao, rice and tropical fruits also flourish to per- tion. With all these advantages the colony is virtually at a standstill, inly on account of the bounty system on beet sugar practised by the ntinental countries of Europe.

STATISTICS.

	1881.	1891.
Area of British Guiana, square miles	109,000	109,000
Population	252,186	278,328
Density of population per square mile	2·3	2·5
Population of Georgetown	47,175	53,176
„ New Amsterdam	8,124	8,903

COMPOSITION OF POPULATION IN 1891.

(*Native Indians excepted.*)

Negro and coloured.	East Indians.	Portuguese.	British and other Europeans.	Chinese.
144,617	105,463	12,166	4,558	3,714

ANNUAL TRADE (*in dollars*).

	1871–75.	1881–85.	1891–95.
Exports	12,500,000	13,000,000	11,000,000
Imports	9,500,000	9,500,000	8,500,000

DUTCH GUIANA

Position and Surface.—Dutch Guiana, known also as *Surinam*, separated from the British colony by the river Corentyne, and from t French by the Marowyne. The coast-line is about 240 miles long, and t colony extends to about the same distance inland. What has been s of the physical geography of British Guiana applies also to the sis colony, for the geological formations, the forests, the climate, and rain of the whole country are identical. The principal rivers, besides th which form the boundaries, are the Suriname, Saramacca and Coppenar

The few white inhabitants are mainly Dutch, and speak the langua of their country; the native Indians, who number about 12,000, are i similar condition to those of British Guiana, and the negroes genera speak a jargon compounded of English, Dutch and African dialec called *talkee-talkee*. Perhaps the most interesting people in the colony a the "bush niggers," descended from runaway slaves, who gave t colonists so much trouble in the latter half of the eighteenth century t the government was compelled to make treaties with them and give th large subsidies. Living in the forest, like the Indians, these people savages of quite a different type, and are curious examples of the effect a new environment on the uncivilised negro race.

History and Trade.—The colony was originally founded by Lo Willoughby, the British Governor of Barbados, in 1650, and was ced to the Dutch in 1667 in exchange for what is now New York. Like neighbouring colonies it suffered on several occasions from the raids French privateers, and was captured by the British at the same time its neighbour, but it may be stated that it was never so prosperous when under British rule during the Napoleonic wars, and may now be c sidered much less prosperous than British Guiana, notwithstanding the pression of the latter. This is shown by the fact that the colony is subsidi by the mother country. It is administered by a Governor and Council.

The main product of the colony was originally sugar, but this largely gone out of cultivation, to be partly replaced by cacao, coffee, bananas. Balata, a kind of gutta percha, is largely exported, also tim and gold, of which last the production in 1899 exceeded £100,000. Th are no local steamers, no railways, and the roads along the coast are continuous. The capital is *Paramaribo*, conveniently situated at junction of the Suriname and Commewine rivers, ten miles from the

STATISTICS.

Area of Dutch Guiana (square miles)	46,060
Population of „ (1896)	62,499
Density of population per square mile	1·3
Population of Paramaribo (1896)	29,261

ANNUAL TRADE (*in pounds sterling*).

	1895.
Imports	460,000
Exports	430,000

FRENCH GUIANA

French Guiana, generally called Cayenne, is separated from the tch colony by the river Marowyne or Maroni, and from Brazil by the apok. It has followed, therefore, that the contested territory between se rivers has, by agreement, been left as a neutral district until the matter ettled by arbitration, which it is understood will soon be done. Unlike other colonies French Guiana has elevated land near the shore, and there several rocky islands off the coast, but otherwise the geological formation similar. The principal rivers are the Mana, Sinnamarie, Approuague, and apok. Settlements were first made here by the British in the early part the seventeenth century; French settlers were in the Sinnamarie in 24, and in Cayenne in 1627, but it was not until after several failures at the present colony was established in 1664. Several unsuccessful empts were made to establish settlements of Europeans during the ghteenth century, and ultimately, since the time of the Revolution when was first used as a penal establishment, it has gained a bad name. evertheless it has all the capabilities of the other Guianas, and could be veloped with advantage. The colony is administered by a Governor d sends one Deputy to the French National Assembly. There are but w plantations, and on these cacao is grown; the other products are gold, lata, phosphates from the islands, and anatto. Latterly the gold export s been very considerable, both from diggings, some across the Brazilian ntier, and from dredging in the river Sinnamarie.

The capital, *St. Louis,* is well situated on what is called the island of yenne, which, however, is only separated from the mainland by the anching of two rivers. The population of the town is increasing from e development of gold-mining.

STATISTICS.

	1877.		1895.
Area of French Guiana (square miles)	31,000	..	31,000
Population of ,, ...	23,663	..	22,714
,, St. Louis (1895)	11,000	..	12,351

ANNUAL TRADE (*in pounds sterling*).

	1889.		1895.
Exports	170,000	..	374,400
Imports	300,000	..	457,500

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II.—VENEZUELA

By Dr. W. Sievers,
Professor of Geography in the University of Giessen.

Position and Natural Divisions. Venezuela occupies the nort of South America from the Gulf of Maracaibo, where it borders on th republic of Colombia on the west, to the Guiana plateau, where it meet British Guiana on the east. Southward it is bounded by Brazil. It i naturally divided into three parts, the highlands of Guiana, the great plain or Llanos, and the high mountain systems of the Cordilleran and th Caribbean Ranges in the north.

Venezuelan Guiana.—Very little is yet known of the interior Guiana. It is generally supposed to be a system of crystalline mountain covered with enormous masses of Cretaceous sandstone. The sandston masses form the highest summits in the east (Mt. Roraima, 8,630 feet), whil overlying Cretaceous strata do not seem to exist in the west, the Sierr Maraguaca and Cerro Duida (each 8,200 feet) being apparently compose of granitic and gneissose rocks only. Towards the north the height of th Guiana mountains decreases considerably, and only monotonous hills o about 1,500 feet reach the Orinoco. The hills of inner Guiana are inter spersed with luxuriant savannas, which are covered with grass more tha ten feet high, and numerous shrubs, bushes, and herbaceous plants, remark able for the extraordinary splendour of their blossoms. The inner parts o Guiana are pathless, and nearly inapproachable, owing chiefly to th numerous cataracts and rapids on the rivers. The west and north o Guiana is encircled by the Orinoco, the third in size of the great indepen dent rivers of South America. Its sources lie in 4° N. in the Sierr Parima; in its upper course the banks are grown with dense woods, bu there are hardly any human inhabitants or animal life. After passin Esmeralda, the Ceaipuare branch leaves the main river and flows to th Rio Negro; the tributaries Ventuari on the right, Atabapo, Inirida, an Vichada are received on the left, and the Orinoco leaves the woods near th mouth of the river Zama. It then breaks through the crystalline roc border of Guiana with the vast rapids of Maypures and Atures, receive the rivers Meta and Arauca on the left, and, increasing rapidly in breadth turns towards the east even before receiving the Apure from the west. I its course to the sea the Orinoco seems to follow the northern slopes of th Guiana plateau, but in fact the channel is cut deeply into them; and variou narrows (*angosturas*) are produced, the most famous one at Ciudad Boliva Near Barrancas the river begins to form its densely wooded delta of abou the area of Wales.

The great gold mines of Callao, in the Yuruari territory, which produce nearly a million pounds sterling in 1884, have declined since 1887, and no yield only one fifth of that amount. Forest produce is also collected an

ported. The only town is *Ciudad Bolivar* on the Orinoco, a river which is no means the great artery of commerce it ought to be.

The Llanos.—In the west and north the Orinoco is surrounded by the anos, extensive plains insensibly sloping down from 800 feet in altitude the river. They are composed of detritus, gravels, sands, clay and ferginous breccias, resulting from the denudation of the neighbouring ountain chains, and probably overlying Tertiary marine strata. The onotonous plains are cut by the rivers into portions called mesas, remarkble for dryness in comparison with the humid ground of the actual lleys. In the west, especially near the Cordillera, the plain produces extenve primeval forests or selvas, while in the State of Bermudez, between aturin and Ciudad Bolivar, there is a typical desert, with drifts of sand nd barren hills. The palma moriche (*Mauritia flexuosa*) borders the vulets on the mesas in double rows, while groups of trees appear wherever subterraneous water exists. The scenery of the llanos therefore equently resembles that of an English park. The principal river is the pure; but the hydrographic axis is formed by the Cojedes and Portuesa with the lower Apure into which they flow. Most of the rivers of the llanos converge to this line, which leads backward to the division between the ordillera and the Caribbean Mountains. The Unare ver is the only one whose valley penetrates deeply to the llanos from the sea, while in the east all the vers flow eastward to the Orinoco delta and the ulf of Paria.

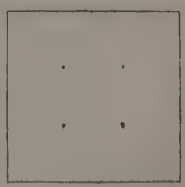

FIG. 429.—*Average population of a square mile of Venezuela.*

The llaneros, or people of the llano, live chiefly cattle-breeding, which is almost their only occuation, agriculture supplying only the barest necessaries of life. The ettlements consequently are yards for cattle (*hatos*), taverns (*pulperias*), nd small villages; larger villages and towns are very rare in the interior the llanos, but on the northern border there are many. The principal ver ports, *San Fernando de Apure* and *Nutrias*, export live stock and roduce derived from them.

The Northern Mountains.—The mountainous country of the north onsists of two principal sections—the Cordillera of Merida, with the ountain systems of Coro and Barquisimeto, in the west; and the Caribbean stem, or the Venezuelan Coast Ranges, on the east. These chains are most entirely interrupted at two points: in the continuation of the ojedes-Portuguesa line between the Cordillera and the Caribbean system, the west, where the elevation of the watershed is only 1,150 feet; and gain on the coast between Cabo Codera and Cumand, where the Gulf Barcelona invades a breach in the northern chain. A third breach parates the island of Trinidad from the mainland.

The Cordillera of Merida is a great folded chain, 15,400 feet in aximum altitude, with an Archæan crystalline zone in the centre, and two

sedimentary flanking zones of Cretaceous sandstones and limestones. Th Cordillera, a continuation of the Colombian Cordillera of Bogotá, is free fro all volcanic rocks; the five highest summits of the most elevated mountai ridge, the Sierra Nevada de Merida, are covered with perpetual snow. Th most important rivers are the Chama in the middle (on which *Merid* stands), the Motatan in the east (Trujillo) and the Torbes in the wes (Tachira). Vast forests cover the northern and southern slopes of th Cordillera up to 10,000 feet; higher up are alpine pastures, and the inhos pitable páramos, and below 5,000 feet plantations, chiefly of coffee, sugar cane, bananas, even of cacao, and fields of wheat and maize. Up to 8,00 feet beans, peas, potatoes and barley can be cultivated.

The population of the Cordillera contains more Indians and fewe negroes than any other district of Venezuela; the former live chiefly in th highest, the latter in the lowest parts of the mountains, the white peopl occupying the intermediate zone. The exports, consisting especially o coffee and cacao, pass through the two principal commercial towns of *Sa Cristobal* and *Valera* to *Maracaibo*; the railways employed are that from *Cúcut* to *Puerto Villamizar* in Colombia, and that from *Valera* to *La Ceiba*; th middle section from Merida has a tolerable outlet by means of the Sant Barbara railway.

The Northern Lowlands.—The lowlands to the north of th Cordillera form an enormous alluvial region, built up by the rivers whic carry the detritus from the surrounding mountains into the depressed are between the Cordillera de Merida and the Sierra de Perijá occupied by th Lake of Maracaibo, which is decreasing in area as its margin is bein silted up. The shallow, brackish lake is closed by a bar, which prevent the entrance of large vessels, nevertheless *Maracaibo*, as the capital of th State of Zulia, and principal port for the Cordillera de Merida and th adjacent parts of Colombia, has grown to be a considerable town. Th bar separates the Lake of Maracaibo from the Gulf of Venezuela, which i surrounded by the peninsula of Guajira in the west, and by the coast o Coro and the peninsula of Paraguaná on the east. Both these peninsula are built up of eruptive rocks and Tertiary strata; they are dry an almost waterless, but have a numerous population. The Guajira aborigina tribe have never been subjugated; the Coro side is occupied by cattle breeding Venezuelans.

The Coro Range.—The Cretaceous mountain system of Coro rise in its two principal chains to less than 5,000 feet. Between these chains broad Tertiary plain of about 1,200 to 1,500 feet in elevation is traversed b the longest stream of western Venezuela, the Rio Tocuyo. Coro, or th State of Falcon, is divided into two quite dissimilar parts, the western a far as 69½° W. is covered with cactus, thorn-bushes, shrubs and dry woods rain being rare, and water scarce; agriculture, therefore, is little developed The old town of *Coro*, founded in 1527, is in this district. The coast o the eastern part is fringed by coral reefs and mangrove woods, and unlik

estern Coro, it suffers from immoderate rainfall, leading to inundations hich discourage agriculture. *Tucacas*, the principal port of eastern Coro, is riving, being connected by railway with the copper mines of *Aroa* and ie capital of the State of Lara, *Barquisimeto*. The State of Lara, lying etween the Cordillera, the Coro mountains, and the Caribbean ranges, esembles Coro in climate and vegetation. Its western part does not xceed 2,600 feet in elevation, is dry, and in the main waterless, although ie river Tocuyo passes through it; the east, Yaracui, is a fresh, humid, ooded land, with large plantations of coffee and cacao trees.

The Caribbean Range.—The Caribbean system of mountains is eparated by the depression of Barcelona into a western and an eastern ection of similar structure. Both are composed of crystalline schists in vo parallel eastward running chains, between which lies a hollow con-

FIG. 430.—*The Railway from La Guaira to Carácas.*

ining in the west numerous dry ncient lake beds, and one, the ke of Valencia, still filled with ater. In the east, besides the ulf of Cariaco, a great shallow goon and swampy lands separate ie two chains. In both sections ie northern chain forms the igged coast of the actual ocean, ie southern the former coast of ie Tertiary Llanos Sea; but in ie west the northern chain is the igher (Naiguáta reaches 9,127 et, and Silla de Carácas 8,743 et), while in the east the southern hain is the higher, with Turumiquire 6,562 feet. The eastern and western ections of the chain present many minor differences in geological and rographical structure, and they also differ in vegetation. In the east, orests are found only up to 2,600 feet, the higher parts being grassy asture grounds, while the western part is richer in wood, and far better ultivated.

The two principal towns of the republic, *Carácas* and *Valencia*, e in the midst of the richest and most cultivated coffee regions of Vene-uela, and so do many important provincial towns. The two chief ports, *a Guaira* (with Maiquetia) and *Puerto Cabello*, are connected by railway ith Carácas and Valencia. Between the small port of *Carenero* at the eginning of the railway to the cacao centre of Rio Chico and Barcelona, ie coast is a level shore without any important anchorage or settlement. *uanta*, the best port of the east, is still almost tradeless, although is connected by railway with *Barcelona*, the capital of the State of ermudez, and the Cretaceous coal mines of *Naricual*. The trade of *Cumaná*, one of the oldest towns in America, is larger, but it has no railway con-

nections ; the principal road of the east of Venezuela leads from it through the dry and woodless mountains to *Maturin*. *Carúpano*, a mediocre port at the foot of the northern chain, exports cacao, the most important produce of the humid country near the canyons of the Gulf of Paria. Margarita, a double-topped island, composed of Archæan schists, is the highest (4,459 feet) of the coast islands, and is densely peopled, while the other small islands off the coast, forming the territory of Colon, have few inhabitants.

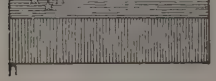

FIG. 431.—*The Venezuelan Flag.*

Government.—The United States of Venezuela are politically divided into nine States, five territories, and a federal district, Carácas and surroundings, with a constitution similar to that of the United States of America. The language of the country is Spanish, and the Roman Catholic religion prevails. The southern boundary is still unsettled. Coffee is the chief export of Venezuela, and is sent mainly to France, Germany, the United States, and Italy.

STATISTICS.

	1881.	1891.
Area of Venezuela (square miles)	594,000	594,000
Population of Venezuela	2,075,245	2,323,527
Density of Population per square mile	3	4
Population of Carácas		72,429
„ Valencia		27,538
„ Maracaibo		29,180
„ Ciudad Bolivar		12,877
„ Barquisimeto		9,093

Exports average £4,000,000 annually ; there are no recent statistics for imports.

POLITICAL DIVISIONS OF VENEZUELA IN 1891.

States. Name.	Area sq. miles.	Population.
Los Andes (Cordillera)	14,700	336,146
Bolivar (Guiana)	88,700	56,289
Bermudez (Oriente)	32,000	300,597
Carabobo (Valencia)	3,000	198,021
Falcon (Coro)	10,000	139,110
Lara (Barquisimeto)	9,300	246,760
Miranda (formerly Guzman Bianco)	34,000	484,509
Zamora (Western Llanos)	25,000	246,676
Zulia (Maracaibo)	26,000	85,456

Territories. Name.	Area sq. miles.	Population.
Distrito Federal (with Carácas)	45	89,13
Amazonas (Alto Orinoco)	200,000	43,10
Guajira	3,600	63,90
Yuruari	81,000	22,36
Delta (of the Orinoco)	25,000	7,22
Colon (Outer Islands)	166	12

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BOOK VI.—AFRICA

CHAPTER XLVIII.—THE CONTINENT OF AFRICA

By Edward Heawood, M.A.

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Position and Coasts.—Joined at its north-eastern corner to Asia by he Isthmus of Suez,[1] Africa forms a vast peninsula, of remarkably regular ıtline, stretching to the south-west of the great land mass of the Old Vorld, and balancing, so to speak, the great island of Australia lying to ıe south-east. On its northern and north-eastern sides it faces, across ɔmparatively narrow seas, portions of Europe and Asia respectively, while ı all other sides it falls rapidly beneath the surface of the Atlantic and ndian Oceans. As is the case with South America the main mass of the ɔntinent runs from north to south, crossing the Equator near the middle f its length, and gradually tapering southwards. In its northern half, ɔwever, it has an important westerly extension forming a rounded limb hich almost rivals in area the main southward-pointing portion, while on ıe opposite side a smaller, more tapering mass runs eastward in the shape f a blunted horn. The distance between the extremities of these two ɔjecting segments is little less than the whole length of the continent ɔm north to south. Lastly, in the north-west a narrow rectangular block ɔjects somewhat beyond the general line of the northern coast, forming ar its western end the nearest approach—at the Strait of Gibraltar—to ıe neighbouring continent of Europe.

Apart from these irregularities, the outline of Africa is remarkably ıiform. There are no deep gulfs running into the land and consequently ɔ well-marked peninsulas. Between the western and southern limbs ns the wide Gulf of Guinea, divided near its apex into two rounded ghts, while on the north coast a shallow indentation forms the Great and ttle Syrtes (Gulfs of Sidra and Gabes). Elsewhere the coast runs in adual curves, broken on a minor scale only by inlets or projecting head-nds. This uniformity is further seen in the absence of important islands. ıe one large African island—Madagascar—is separated from the conti-nt by a channel far deeper than the Red Sea which separates Africa ɔm Asia, and more continuously deep than the Mediterranean, the

[1] The Suez Canal, sometimes said to make an island of Africa, is such a mere surface atch that it may be disregarded in considering the natural relations of the continents one another.

dividing sea on the side of Europe; so that it stands in no close relatio to the main continental mass. The islands which lie off the coasts are a of small size, and none of any importance occur round the whole souther coasts for a distance of 4,000 miles.

Relief.—A general sameness is also noticeable in the relief of th continent. Folding and crumpling of the surface strata seem to hav played a much less important part in Africa than in other continents, an in consequence there is a marked absence of mountain ranges, as dis tinguished from irregular groups of mountains or isolated peaks. Th typical form of surface is that of elevated plateaux, from the surface o which higher ridges or summits often rise abruptly. These plateau land fill up the great bulk of the continent, their outer slopes or terrace occurring everywhere comparatively close to the sea and nowhere leavin room for extensive low plains. Th highest ridges occur as a rule nea the outer edge of the plateau, an round the outer escarpments ther is generally a narrow fringe of low land, but in places the highland rise almost directly from the sea In elevation there is an importan distinction between the plateaux o the northern and southern halve of Africa, those of the north being on the whole, far lower than thos of the south. Drawing a curve line from the coast of the Red Se in the east to the head of the Gul of Guinea in the west, we may sa that whereas land over 2,000 fee above the sea is the exception to the north, to the south it is the exceptio to find land below that elevation except close to the coasts.

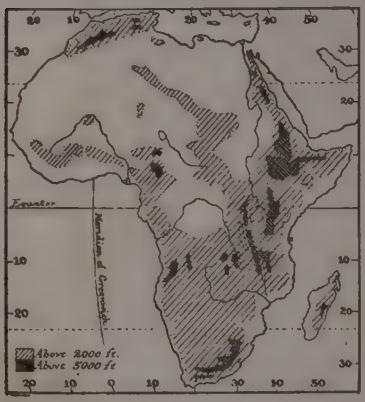

FIG. 432.—*The Configuration of Africa*

In spite of the lower average elevation of North Africa, it contains th Atlas, the one important mountain range. It runs parallel to the mos projecting part of the northern coast, rising in its most pronounced western, half to a height of 14,000 feet and more. Owing to its directio it does not help to form any well-marked peninsula such as that of Ital on the opposite side of the Mediterranean, though as it plunges below the se to the east it forms, for Africa, an unusually prominent angle of the coas To the south the Atlas falls suddenly, and near its eastern end there is depressed area actually below sea-level; the range is therefore quit unconnected with any of the other highlands of North Africa. Thes occur chiefly in three lines with broad expanses of lower country betwee them. One runs nearly north and south along the western shore of th Red Sea; a second runs from north-west to south-east across the ver

tre of northern Africa; while the third—wider but somewhat lower n the two first—forms a strip of plateau parallel to the northern shore he Gulf of Guinea. The intermediate areas probably nowhere rise to eight of 2,000 feet except in isolated groups of peaks.

In the southern half of Africa the greater part of the plateau rises to an rage elevation of little less than 4,000 feet. One noteworthy break in uniform high level occurs in the western half, where, on either side he Equator, there extends a vast circular basin, bounded on all sides higher ground, which seems to represent the bed of an ancient inland

Abreast of this to the east a band of very high ground, continuous n the eastern line of northern Africa, runs from north to south, attaining greatest average elevation in Abyssinia, and forming the most important ılands of all Africa. It is marked, towards the south, by the presence number of lakes of very large size, many of which occupy portions of vast furrows also running mainly north and south and forming one he most striking features in African geography. They seem to be due igantic cracks or rifts in the Earth's crust, which have resulted in two g lines of subsidence. Other evidences of subterranean disturbance present in the form of old volcanic cones, some of which, Kilimanjaro, ya, and Ruwenzori, rise to heights of 17,000 to 19,000 feet, and are the nest summits of all Africa. From the floor of the western furrow rises ill partially active volcano (Kirunga), remarkable as occurring at a ance of nearly 700 miles from the sea.

Though narrower and lower to the south, this eastern line of highlands ontinued in that direction to the extremity of the continent, forming r its southern end the Drakensberg Range with peaks of 10,000 and oo feet. A line of high ground accompanies the western coast also, le the interior is filled by a plateau of somewhat lower elevation than bounding ranges, so that the whole of South Africa bears a general emblance to an inverted saucer.

Hydrography.—As the main lines of elevation run at no great ance from the coasts, Africa has no central backbone dividing the tinent between eastward and westward flowing river systems. These r rather be distinguished as flowing down the outer or the inner slopes he fringing highlands. Those which descend the outer slopes have of rse comparatively short courses, while the inward-flowing streams have at distances to traverse before reaching the sea, and therefore form the at river systems of the continent. As a rule they pierce the mountain by narrow passages, during which their courses are much broken by aracts. As a continental water-parting the eastern line of highlands ys the most important part, for from the north-east corner, where Africa s Asia, through about 43° of latitude, it gives no passage to a river, but ctively separates the streams flowing to the Atlantic and Indian Oceans. bout 12° S., however, the water-parting diverges to the west, crossing continent, and including within the basin of the Indian Ocean almost

the whole breadth of South Africa as far as 22° S., where it again stri across to the east.

Owing to the position of this water-parting, the largest river systems those which spring from its western rim, flowing west and north, and belonging to the Atlantic basin. The two largest are those of the Nil flowing from south to north but receiving its principal tributaries from main watershed to the east—and Congo, describing a vast bend to north and west and with its many important tributaries occupying circular hollow of the ancient inland sea. The drainage system of Niger, in the western limb of the continent, and therefore away from main watershed, is still within the Atlantic basin. It also forms a v curve, but the principal flow of its waters is towards the east and sou or exactly the reverse of that of the Congo. With the exception of basin of the Orange in the south, the remaining Atlantic streams flow do the outer continental slopes. The principal are the Senegal, Gambia a Volta in the western limb, and the Ogowe, Kwanza and Kunene on western side of the southern limb. West of the great water-parting, a therefore included within the Atlantic basin, there is a vast area of inla drainage consisting of the central basin of Lake Chad, fed principally the Shari, and a still larger area in which any streams that exist are mer temporary.

On the side towards the Indian Ocean the only great river system that of the Zambezi, enclosed within the westward curve of the m divide. The greater part of it is on the central plateau, while all the oth streams flowing to the Indian Ocean—the Jub, Tana, Rufiji, Limpopo a others—flow mainly down the outer plateau slopes and have a greater less importance according as these recede from or approach the sea.

Interpolated between the basins of the Atlantic and Indian Ocea along the broad uplands which form the continental divide in East Afri is a narrow region of inland drainage, the central furrow of which formed by the more easterly of the great lines of subsidence alrea mentioned.

Geology.—The geology of Africa has not yet been fully inve gated, and even where the formations have been studied to some ext it is often impossible to determine their age owing to the gene scarcity of fossils. A broad distinction may be drawn between t Atlas range, with other parts of North Africa, and the rest of t continent, inasmuch as ancient crystalline rocks are almost entir wanting in the former region, whilst elsewhere, and especially in t inter-tropical zone, there seems to be a foundation of Archæan roc which come to light especially along the axes of mountain ranges. The old rocks consist of granite and of gneiss in East Africa, and schists a other foliated rocks in West Africa. The chief sedimentary formatio which have been found to overlie these ancient rocks throughout t greater part of Central and South Africa are of Palæozoic or early Mesoz

the latter being particularly well represented in South Africa, where Karroo beds (Triassic) occupy a large area. Jurassic and Cretaceous ta occur in parts of East Africa, and from the nature of its fauna it has n thought that Lake Tanganyika is the remnant of a Jurassic sea which tched inland from the west. No Jurassic strata have, however, been nd in the intervening area. Horizontally bedded sandstone, mostly of btful age, is common throughout Central Africa, while recent alluvium ers the centre of the Congo basin, and shifting sands much of the desert ons. In the East African highlands recent eruptive rocks have spread immense areas.

While, therefore, the later Secondary and Tertiary formations seem to ut slightly developed in Central Africa, in the north they are well repre-ed. In the Atlas, which forms, geologically, one of the best known ts of Africa, the Cretaceous system occupies the widest extent of the face, in a series of beds comparable with those of Europe. It appears as a horizontal deposit over a broad region bordering on the Atlas to south and south-east, and a vast series of sandstones on the lower Nile own as the Nubian sandstone), is supposed to be of the same age. ng the north-west coast, and in a few parts of the Atlas, Tertiary for-ions, chiefly Miocene, occur, but these attain their maximum develop-nt further east, the whole surface between the Gulf of Sidra and the mus of Suez consisting of Tertiary rocks.

Climate.—The uniformity characteristic of Africa is less marked in climate and productions, which neces-ly differ according to latitude; but as equator cuts the continent almost at the dle of its length, the climatic differences much less extreme than in other conti-ts. This central position of the equator lts in a succession of climatic zones tching across the continent, those of the h being reproduced in reverse order in south. The primary cause of variation ween the zones is of course the difference ne amount of heat received from the Sun. h the northern and southern extremities fairly temperate regions, that to the h being defined by the Atlas range, the is north of which, climatically as in other respects, rather resemble thern Europe than the rest of Africa. Within the tropics the mean ual temperature varies within comparatively small limits, though there differences in the distribution of temperature through the year. Near the ator, and especially in the coast-lands and western basin, the climate is erally equable, whilst elsewhere, especially in the elevated regions to east, there is a much greater difference between summer and winter,

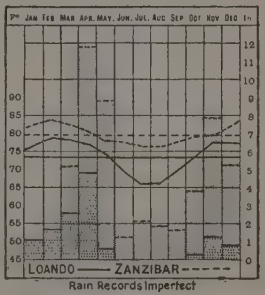

FIG. 433.—*Temperature and Rainfall of Tropical Africa.*

and between day and night. The absolute extreme of temperature d
not occur on the equator but between the parallels of 10° and 20°
where the average elevation is lower and the mass of land greater. Ow
to the altitude of much of the land within the equatorial zone, the clim
is often actually cool.

Far more important than differences of temperature is the variatio
amount and seasonal distribution of rainfall. Bordering on the north
south temperate zones occur areas of minimum precipitation where de
conditions prevail. Owing to the form of the continent the north
desert zone, known as the Sahara, occupies an enormously greater a
than the southern, forming, in fact,
largest continuous desert on the Ear
surface. The Sahara forms part of
great arid belt which stretches across
Old World from north-eastern Asia to
borders of the Atlantic Ocean. Virtu
forming part of the greatest land-mass
the surface of the globe and thus little
posed to the moderating influence of
oceans, North Africa presents an exam
of an extreme continental climate, w
great differences between the seasons.
winter it forms an area of high press
and thus the winds blow outwards in
directions, while in summer, although
low pressure over the Sahara causes
indraught of air from its circumferen
the intense heat constantly diminishes
relative humidity of these air currents,
they exercise a drying rather than a moist
ing influence. The southerly winds fr
the direction of the equator do, it is t
bring a certain amount of moisture,
the greater contrast in temperature
tween North Africa and the regions to the north causes the dry northe
winds to predominate. By its position at the northern edge of the c
tinent the Atlas range does its part in screening the desert from the act
of moisture-bearing winds, while the paucity of mountain ranges in
centre of North Africa is a further reason for the small precipitati
Where such exist, as, *e.g.*, in the countries of Air and Tibesti, local rain
some violence occur. Such rain-water soon sinks below the surface, of
travelling immense distances before coming to light again as springs,
bringing fertility to isolated spots amid the barren wilderness, known
oases.

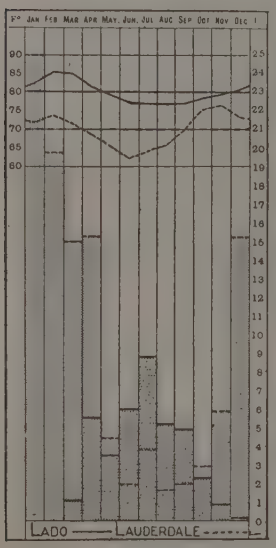

FIG. 434.—*Temperature and Rainfall of North and South Tropical Africa.*

Between the northern and southern desert regions the rainfall gradu

eases in the direction of the equator, in the neighbourhood of which greatest rainfall occurs. But besides the variations of annual amount e is an important difference in different latitudes in the seasonal dis- ıtion of the rainfall. At a distance from the equator all the rain falls ne part of the year, the wet season commencing soon after the Sun ɔmes vertical, and lasting for two or three months, while the rest of the is dry. But as we approach the equator, since the Sun is vertical e in the year, there are two rainy seasons separated by an interval of weather, while near the equator itself rain falls more or less throughout year. Local differences of rainfall, apart from the influence of latitude, ɔurse occur, certain mountainous regions being especially rainy, while ical West Africa, on the borders of the Gulf of Guinea and in the n of the Congo, has a larger rainfall than the eastern part of the inent between the same latitudes.

Flora.—The varying climatic conditions naturally exercise a most ortant influence on the vege- ɔn, and through it on the nal life of the continent. The hern temperate region has a similar on the whole to that southern Europe, the forests sisting largely of oaks, while olive, vine, fig, as well as the als of Europe, thrive. Owing ts isolation the southern tem- ıte region has a strongly marked of its own, characterised es- ally by the general brilliancy its flowering plants and the ndance and variety of heaths. ests are not extensive, but much he surface supplies fodder for le and sheep. The desert regions, as their name implies, are in many s—especially where the sand is piled up by the action of the wind into es—almost entirely devoid of vegetation, and that which exists is stunted thorny, being differentiated so as to be specially adapted to the dry ıate. One of the most common bushes is the gum acacia. As a rule plants v in tufts with bare spaces between instead of forming a complete ering of the surface. In the oases the date-palm, the characteristic tree ıe Sahara, forms dense groves. On the margin of the desert, proceeding he direction of the equator, the vegetation increases and a steppe-like on ensues, still largely characterised by thorny acacias, while another ı, the Dum or *Hyphaene*, makes its appearance. The moister regions Central Africa fall broadly into two main divisions, the forest and ınna. Where an abundant and evenly distributed rainfall is con-

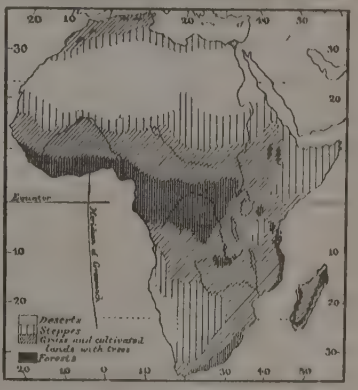

FIG. 435.—*Vegetation of Africa.*

bined with an equable temperature a luxuriant forest growth is develop
such being the case generally in the whole of the tropical coasts of W
Africa together with the lower parts of the Congo basin. Forests
occur on the east coast and generally on the slopes of mountains expo
to moist winds from the sea. The whole of the remainder of trop
Africa forms the region of savannas, remarkably uniform in charac
and extending from the Senegal in the north-west to Abyssinia in
north-east, and thence through East Africa round the western forest reg
until it reaches the west coast again south of the Congo. Trees are usu
found along the courses of streams, where they form what are known
"gallery forests," and are often dotted over the surface in groups, givin
a park-like appearance.

The savanna regions are characterised especially by the occurrenc
the massive Baobab tree (*Adansonia digitata*), and in the drier parts by
curious candelabra-like Euphorbia. An immense variety of trees is fo
in the western forest region, which is the special home of the wine and
palms (*Raphia vinifera* and *Elaïs guineensis*). A special flora occurs
many of the higher African mountains, which present a succession
zones of vegetation varying with the altitude. Bamboos form reg
thickets above the true forest zone, whilst higher still occurs a pecu
type of vegetation consisting largely of tree lobelias and a giant specie
Senecio. Lastly, a type of vegetation deserving mention is that growing
the swampy margins of streams especially in the upper Nile and Co
basins; it is marked by the luxuriant growth of papyrus and other aqu
plants.

Fauna.—The distribution of animal life upon the continent foll
very closely the broad subdivisions of the flora. The desert regi
however, apart from the negative characteristic of scarcity of anim
are less individualised in this respect, forming rather areas of tra
tion between the regions on either side of them. The main divid
line of the continent has, in fact, been drawn across the centre of
Sahara at the Tropic of Cancer; all to the south of this line makes up w
is known as the Ethiopian Region, while the smaller area to the n
has more in common with the countries north of the Mediterran
Especially characteristic of the Ethiopian Region is the abundance
ungulates and carnivorous animals, the former including two families,
hippopotami and giraffes, found nowhere else in the world. But
family best represented is that of the antelopes, which occur in ex
ordinary numbers, while the deer are almost entirely wanting. F
species of rhinoceros represent a group common to Africa and sou
eastern Asia. The carnivores include the lion, leopard, several hyæ
the jackal, and a large number of civets and their allies, but the tiger,
and wolf are wanting. The African elephant was formerly found throu
out nearly the whole of the Ethiopian Region, but its range is now m
restricted owing to the persecution it has met with for the sake of its iv

keys, especially the baboons and their allies, are widely distributed, crocodile abounds in all the rivers, and snakes and other reptiles ommon everywhere. Birds are less varied than in some other parts of ropics, but a few striking forms occur, including the ostrich, the st existing species. Within the Ethiopian Region the savanna areas their abundant pasture, are fitted to be the home of large ruminants, of the carnivores which prey on them. The forests, on the other hand, ttle adapted to the life of large animals except the elephant, and in parts are strikingly devoid of animal life. They are, however, the al home of the great man-like apes, which hardly extend at all nd the forest boundary. Though poor in wild animals the northern ts are pre-eminently the home of the camel, among domestic animals, e all the drier parts are particularly suited to the ostrich.

eople.—Four different races inhabit the African continent, the two ern, Semitic and Hamitic, nging to the White type of kind and the two southern to Black type. The dividing line een the dark and lighter races ot be drawn with any pre-n, as along the borderland is a large number of mixed s which cannot be placed in r division. It occurs, broadly king, near the southern edge e northern arid regions, which principally peopled with Se- and Hamites; the larger of the continent is thus occu- by the black races, and of this ut a small corner falls to the o race, which preponderates more in point of numbers, as its habitat includes but a small area rid country. Its domain may be divided into two sections sepa- by a line running roughly eastward from the head of the Gulf Guinea. Along the coasts of that gulf and eastwards towards the re of the continent the population is regarded as typically Negro, as broad, everted lips, projecting jaws, and deep black skin characteristic at race, are there particularly marked. As this region has long been v to the northerners as Beled-es-Sudan, or "Land of the Blacks," the Sudan Negroes has been applied to this branch. Although physically , the Sudan Negroes speak a great variety of languages. The rest of Negro domain, occupying the greater part of the southern limb of the inent, is peopled by tribes differing much in physical character, but peaking nearly allied languages, and on this account grouped together

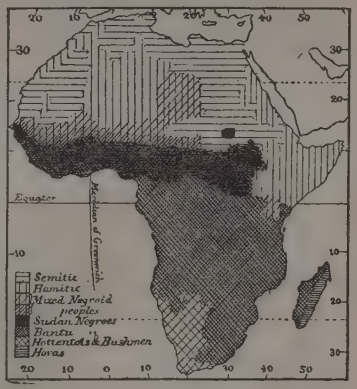

FIG. 436.—*Races of Mankind in Africa.*

under the common designation "Bantu" (a corruption of *Abantu*, "peop
in the Zulu language). The Bantu are generally lighter in colour t
the Sudan Negroes, and many tribes show signs of admixture w
other races.

Only the extreme south west parts are at present occupied by the ol
dark skinned race that of the Hottentots and Bushmen, about wh
relationship considerable doubt exists. They differ from the Negr
physically in their yellowish brown colour, more prominent cheek bo
and certain other characters common to the two races, which are li
wise connected by their languages, remarkable for their strange click
sounds. The most marked point of divergence is the taller stature of
Hottentots, who seem, in some ways, to occupy an intermediate posit
between Negroes and Bushmen. The latter are unusually small, and
on this account sometimes grouped with other races of small stat
scattered throughout the more inaccessible parts of the Bantu dom
which may possibly represent an aboriginal population driven back bef
more powerful intruding races.

The races of North Africa are much intermingled and no area of
size can be laid down as exclusively the home of either. Their phys
differences too are not very pronounced, both Hamites and Sem
showing every variety of tint, while oval faces, aquiline noses,
generally well formed features may be seen in representatives of b
races. Whatever may have been their original home, the Hamites rep
sent an earlier population than the Semites many branches of wh
crossed over from south western Asia within historic times. The anci
Egyptians, of whom the Fellahin of the present day are thought to be
descendants, seem to have belonged to the Hamitic stock, which inclu
besides, the Berbers of the Atlas region, the Tuareg of the central Sah
the Bisharin, or Beja, near the Red Sea coast, and the Galla, Somals,
Masai in East Africa, while along the whole northern frontier of the Neg
domain a considerable mixture of Hamitic blood is to be traced. T
Semites include, besides the various Arab tribes of north and north w
Africa, an important part of the inhabitants of Abyssinia, which w
invaded by the Himyarites of Arabia in very early times.

Social and Political Characters. The occupations of the peo
although to some extent determined by the predisposition of the differ
races, acquired perhaps in former habitats, are still more definitely c
nected with the varying nature of the surface features. The Semites
Hamites, inhabiting the dry regions of North Africa, are pre-eminen
pastoral, agriculture being practised to any large extent only in the N
valley, the Atlas region, and Abyssinia. Along the whole borderla
between the Hamites and Negroes the ruling class (Hamite) is devoted
cattle-rearing, while the agricultural population (sometimes pure Neg
forms a subordinate caste. The Negro race as a whole is agriculturist, a
throughout the West African forest region where pasturage is scar

le-rearing is little practised. Yet certain tribes of the savanna region, ably the Zulus and Kaffirs of the south east, as well as the Dinkas and rs of the Upper Nile, practise it extensively in conjunction with culture. The Hottentots, who inhabit the arid region of the south , are again pre-eminently pastoral, while the Bushmen and other s of small stature live chiefly by hunting.

The peoples of Africa are alike remarkable for the small amount olitical cohesion they exhibit, the few States of any importance which arisen since the time of the ancient Egyptians having been almost rely the result of external influence. The nomadic pastoral races of north dwell under the patriarchal rule universally associated with that le of life. Where agriculture can be practised, as in Abyssinia, polit organisation has proceeded further. The Negroes, on the other hand, gh agriculturists, show a marked incapacity for the establishment of le kingdoms, being split up into a great number of independent tribes, d by petty chiefs, whose authority often extends over a few villages , and who live at constant feud with each other. The universal pre nce of polygamy, leading to intrigue among the families of the chiefs, tended to perpetuate this state of things, and still more the slave e, which has been the scourge of Africa for centuries, and which ourages inter-tribal warfare for the supply of prisoners. The religion e Negroes is a compound of degrading superstitions, fetishism being ely diffused, and this has done much to keep the race in a backward . Except in Abyssinia, where a debased form of Christianity prevails, Hamites and Semites are all adherents of Islam, which since its intro ion by the Arab invaders, has exercised a certain civilising influence, the few native States of any importance on the Mediterranean and among the mixed races south of the Sahara may be as d to its agency. At the present day the southward advance of Islam ng the Negroes has an important bearing on the future of the inent.

History. Although North Africa, from its contiguity to the Mediter an, has from the earliest times participated in the life of the world at , the bulk of the continent, shut off on the north by the great Saharan rt, and placed at a disadvantage on other sides by its massive form, its of navigable waterways, and its unhealthy coastlands which have the rise of no powerful kingdoms and offered few inducements to mercial activity, has, apart from a certain amount of intercourse ween its east coast and the south west of Asia, remained entirely outside pale of civilisation. Such isolated episodes as the supposed journey e Nasamonian youths across the Sahara and the circumnavigation by Phœnicians (related by Herodotus), or the voyage of Hanno, the Car inian, down the west coast, did but momentarily lift the veil of urity, and though during the Roman epoch some light reached Europe ugh the travels of merchants, the Nile expeditions initiated by Nero,

and the geographical investigations of Ptolemy of Alexandria, the Sara
conquest of North Africa in the seventh and following centuries cu
the rest of the continent from all intercourse with Europe, and for sev
centuries the only additions to knowledge were supplied by the writing
Arab historians, who left some record of the kingdoms founded by A
influence to the south of the Sahara. A new era dawned when, earl
the fifteenth century, Prince Henry of Portugal devoted himself to
discovery of a sea route to the east round the African coasts, for his unti
efforts, carried forward after his death by others, led to the rounding
the Cape of Good Hope by Bartholomew Diaz in 1488, and the succes
voyage to India of Vasco da Gama in 1497–98. In course of time Po
guese settlements were formed both on the east and west coasts, and w
other European nations entered the field trading stations were es
lished by them on the coasts of Guinea and elsewhere, while in 1
the Dutch occupied the site of Cape Town. At the opposite end of
continent the Turks had established themselves along the Mediterran
shores in the previous century. During the most flourishing days
their rule the Portuguese penetrated some distance into the inter
especially in Abyssinia, but it is uncertain how far their knowle
extended. On the Senegal and Gambia, French and British adv
turers attempted, without much success, to penetrate to the mysteri
city of Timbuktu.

The systematic exploration of the interior has, however, been alm
entirely the work of the past century. Between 1768 and 1772 Ja
Bruce made his celebrated journey to the source of the Blue Nile, but
founding of the "African Association" in 1788 was the event from wh
the modern period of exploration must be dated. The discovery of
course and termination of the Niger—due chiefly to the journeys of Mu
Park (1795–1805) and Lander (1830)—and the exploration of parts of
Sahara and Sudan, with the discovery of Lake Chad—the work of Denh
and Clapperton (1822–27)—were the earliest fruits of the interest t
aroused. The journeys of Laing (1825) and Caillié (1828) to Timbuktu
deserve mention. In South-East Africa the Portuguese scientific explo
J. de Lacerda, made an important journey in 1798. In South Afr
where the Dutch settlement finally passed into British hands in 1806, s
progress was also made, especially by the journeys of Dr. Andrew Sm
and Captain J. E. Alexander. The conquest of Algeria by France in 1
and of the Eastern Sudan by Mehemet Ali of Egypt in 1820–21, paved
way for an advance in these directions, and an Egyptian Expedi
ascended the Nile as far as 4° 42′ N. in 1841.

A period of renewed activity began in 1849, in which year Dr. Livi
stone made his first exploring journey from the south, discovering L
Ngami, while reports of snowy mountains in East Africa came from
missionaries Krapf and Rebmann, and preparations were made for a Bri
Government expedition from the north to the central Sudan. Import

ts followed in all three directions. Dr. Livingstone reached the bezi, made his way to the Portuguese colony of Angola, and returned ss the continent to the mouth of the Zambezi (1851–56), while other llers, including Galton, Baines, and Mauch, filled in the details of the try south of that river. In East Africa an expedition despatched by Royal Geographical Society, under Burton and Speke, reached Lake ganyika and the Victoria Nyanza (1858); while Speke, returning with t in 1859, further explored the Victoria Nyanza, and discovered its t towards the Nile, thus virtually solving the problem of the Nile ces. In 1864 Baker discovered the second Nile reservoir in the rt Nyanza. In North Africa the expedition, led at the outset by Richardson and afterwards by Dr. Barth, traversed the central n in various directions, and threw a flood of light on its im- ectly known geography. Good work was also done later by Rohlfs Nachtigal.

The exploration of the great Congo basin, so far a blank on the maps, ushered in by Dr. Livingstone's last great journey (1866–73). Pro- ing by way of Lake Nyasa (discovered by him and Sir John Kirk in) he came upon a vast northward flowing river system, which he at first idered to belong to the Nile basin, but which still retained its secret n death overtook him on the shores of Lake Bangweolo. Cameron w additional light on this river system by his journey of 1873-76, ng which he discovered the outlet of Lake Tanganyika, but the solution e problem was supplied by H. M. Stanley, who, after important explora- in East Africa, turned his steps westward and amid incomparable culties and dangers traced the great Lualaba to its termination as the go in the Atlantic Ocean. An important journey into the Congo basin the north had been made in 1869–71 by Dr. Schweinfurth, and t the same time Egyptian sovereignty was extended to the Albert nza.

The largest share of African exploration had so far fallen to British ects, but the interest of Europe was now thoroughly awakened and orers of all nationalities flocked to the shores of the continent. Poli- activity was also aroused. A vast undertaking, initiated by King pold of Belgium, finally led to the formation of an Independent State he Congo, whose many branches have since been explored by the e officials. France, likewise, pushed into the interior from Algeria and settlements on the Senegal and Gabun, in time extending her influence the greater part of the western Sudan, and even to Lake Chad and Nile watershed. In 1882 Great Britain acquired a preponderating ence in Egypt by the suppression of the military revolt under Arabi a. In 1884 Germany obtained a footing in South-West Africa, in er Guinea (Togoland), and the Cameroons (Kamerun), and soon wards in East Africa, where in 1886 and 1890 the most fertile portions e partitioned between that country and the United Kingdom. Before

this the journeys of Joseph Thomson had much enlarged the bounds our knowledge in East Africa, especially in the country of the drea Masai tribe.

In 1884 a British protectorate was declared over the lower Niger, British influence is now recognised in this region as far as Lake Chad. extension of the older colonies of the Guinea coast has, however, been m hampered by the French expansion. In South Africa the bounds of Bri territory have been pushed far to the north, reaching beyond the Zamb and joining hands with another young settlement on Lake Nyasa. In Nile basin civilisation received a severe check by the Mahdist revol 1883, and not till 1898 was the eastern Sudan once more liberated by Anglo-Egyptian campaign under Lord Kitchener. Italy gained a foot on the Red Sea in 1882 and subsequent years, and afterwards on the Son coast south of Cape Guardafui. Her attempts to establish a protecto over Abyssinia have, however, proved unsuccessful. Portugal has obtai some extension of her old colonies on the east and west coasts, but failed to realise her dream uniting them across the contin These territorial acquisiti first received international rec nition at the Berlin Confere of 1884; and subsequent ag ments between individual Pow have brought practically the wh continent under European in ence. Important agreements c cluded in 1890–91 between United Kingdom and Germa France, Italy and Portugal det mined the broad outlines of partition of the interior, but many points open to dispu especially between the Uni Kingdom and France. These were finally settled by the Niger Conv tion of 1898 between those countries, and by the supplementary Decla tion of 1899. France has thereby made good her claim to a continu territory extending from the lower Congo round the eastern shores of La Chad to Algeria in the north and the Senegal in the north-west; and t United Kingdom has established political ascendancy over the whole up Nile basin. Explorers have more and more worked from political motiv confining their attention chiefly to the spheres of their respective countri Among the host of names deserving credit for the filling in of details the map of Africa since Stanley's great journey of 1874–77, those Thomson, Teleki, and Baumann (East Africa), Wissmann and Grenf (Congo basin), Binger and Monteil (West Sudan), Foureau (Sahara), a

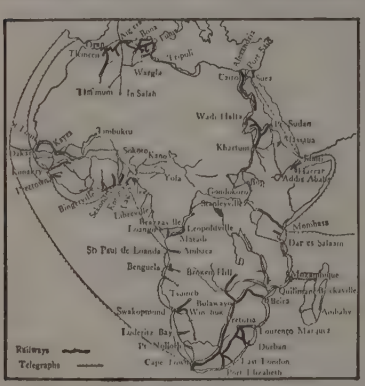

FIG. 437.—*The Railways and Telegraphs of Africa* (1907).

go (Galla and Somali-lands), stand out pre-eminent for the value eir achievements.

th the increase of exploration efforts have been made to open up omparatively healthy plateaux by railways from the coast; the pene- n is greatest from Cape Town in the south and Cairo in the north, and hoped that these systems may be united in the not distant future. from the submarine cables, which form loops round the coast, over- lines have been carried into the interior in advance of the railways; ire from Cape Town will soon be open along Lakes Nyasa and Tan- ka to Uganda and ultimately to Cairo, while a line is being constructed Leopoldville on the Congo to Lake Tanganyika.

POLITICAL DIVISION OF AFRICA.

APPROXIMATE AREAS.

	Sq. miles.
uropean Colonies and Protectorates :—	
French territory[1]	3,712,000
British territory[2]	2,165,000
Egypt (with Sudan to 5° N.)[3]	1,135,000
Congo State (Belgian influence)	905,000
German territory	905,000
Portuguese territory	794,000
Tripoli with Fezzan (Turkish)	340,000
Italian territory	230,000
Spanish territory	82,000
lative States outside European influence :—	
Abyssinia	320,000
Morocco	180,000
Liberia	52,000
Unclaimed (Eastern Sahara)	630,000
arger lakes	70,000
Total	11,520,000

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1 Including Wadai and a large area of the Sahara still unoccupied
2 British East Africa is considered to extend to 5° N.
3 Under Turkish suzerainty, administered by Great Britain.

CHAPTER XLIX.—NORTH AFRICA

I.—MAROCCO

By Lieut.-Col. Sir R. Lambert Playfair.

Position and Extent.—The Empire of Marocco (often wr Morocco) extends on the north from Cape Spartel, a distance of 300 n to the frontier of Algeria. The boundary between them, fixed by trea 1845, starts from the river Kiss and runs in a south-easterly directio a little beyond the 33rd parallel of latitude. On the Atlantic coas Empire extends for a distance of 450 miles, as far as the Wad. Dr

Condition and History.—Marocco is the last of the Barbary S which has preserved its independence, and it is peculiarly interesting the fact of its standing alone as a monument of barbarism. The S rovers, it is true, no longer scour the seas as of yore, but the inhabi of the Riff country, who have given the word Ruffian to the En language, are as much pirates at heart as ever, and they lose no chanc plundering any vessel which may happen to come too near their in pitable shore. There is no country near Europe so little known. U 1820 the largest share of the information we had of it was derived from narratives of Christian captives, or of the envoys sent to effect ransom. Its geography and natural history have more recently illustrated by many eminent travellers.

Configuration and Rivers.—The configuration of the Atlas and hydrographical system of the country are not essentially different those of Algeria, but, inasmuch as the mountains are higher and in s places covered with perpetual snow, the rivers on both sides of the r are more considerable. The exact height of the loftiest peak is not kn but Joseph Thomson ascended one in the southern Atlas 12,700 feet, another 13,000 feet above the level of the sea.

Marocco has no navigable rivers, but some could be made so if sandbanks at their mouths were removed. The only considerable on the Mediterranean coast is the Muluia, the ancient Molocath, which h course of 400 miles. Those on the Atlantic coast are the Kus, the S the Bou Ragreg, the Um-er-Rebia, the Tinsift, the Sus, and the Draa. summer they are half dry, but in winter they are raging torrents.

Productions and Communications.—Some of the plains valleys are of great fertility ; cereals are grown abundantly, though c vated in the most rudimentary manner. Dates, olives, figs and many o fruits are plentiful. Marocco, as a rule, is a treeless country ; the nort slopes of the Atlas contain finely wooded valleys, but beyond this remains of the natural forests which at one time covered western Barb There are rich mineral deposits in the Atlas, quite unworked. The r

hout the country are mere bridle-paths worn by travellers, beasts of
, cattle, sheep and goats throughout uncounted ages. No railways
the empire.

ople and Government.—The population of Marocco does not
ly exceed four millions and has nearly the same composition as
geria, except for the lack of the European element. Marocco has
called a crumbling empire ; it is governed by an absolute Sultan,
turbulent aristocracy, but from a religious point of view it is the
ronghold of Islamism. The only resources of the treasury are
ons and authorised robbery from one end of the social scale to the
The trade is insignificant compared with the size of the country.
produce and manufactured leather are exported, and textiles im-
. The United Kingdom stands first in the share it takes both in
port and the import trade.

owns.—The three capitals where the Sultan resides alternately are

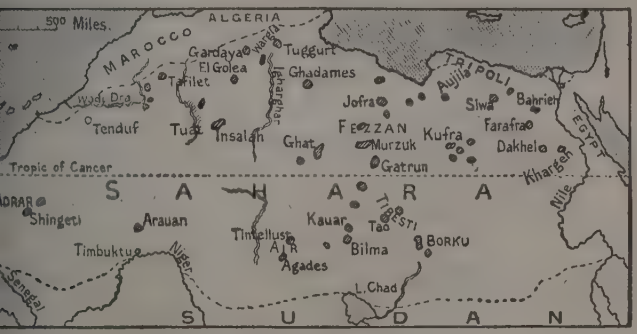

FIG. 438.—*The Oases of the Sahara.*

Fas), *Mekenes*, and *Merakish* or Marocco city. The towns on the
commencing from the Algerian frontier, are *Tetuan*, *Tangier*,
h (*El-Araish*), *Sallee* (*S'la*), *Rabat*, *Casa-Blanca* or *Dar-el-Beida*,
gan, *Safi*, and *Mogador* or *Suetra*. These have a varnish of civilisation,
the interior, though not without relics of past splendour, the towns
asses of ruin and all-abiding filth. The most important, naturally,
gier, where the diplomatic agents of foreign Powers reside. It is of
ar interest to Englishmen as it formed part of the dowry of
rine of Braganza on her marriage with Charles II. in 1662. After a
and badly managed British occupation, it was evacuated in 1683. It
a favourite residence for winter visitors.

haran Oases.—All along the Saharan slopes of the Atlas there
ases inhabited by more or less independent tribes owning the
inty of the Sultan. The most important is that of *Tafilet* or Tafilelt,

about 200 miles east of Merakish. This remarkable place has been vis recently by Mr. Harris, who went from Merakish, crossing the A range, through a district inhabited by Berbers, every part of whic dominated by great castles, often 50 feet high, with richly decor towers. Tafilet consists of a strip of fertile land, growing vast quant of dates, extending along the parallel beds of the Wad Ziz and the W Gheris, rivers which irrigate 400 square miles before being lost in sand. There is no city of the name of Tafilet; the capital of the dis was Sigilmassa, so familiar to readers of mediæval works on Marocco, a complete ruin. Here is the resting-place of Mulai Ali Sherif, ancestor of the reigning Sultan, whose tomb is held in great veneration

About 100 miles to the east is the Wad Ghir, the upper part of w was seen by the French soldiers of General Wimpffen's expedition in 1 who compared it, in volume, to their own Meuse. After receiving waters of the Zusfana at Ighli, the united stream flows southward u the name of the Wad Messaud, and eventually becomes lost in the b of El-Erg. This is geologically the most extraordinary part of the Saha it is an immense tract of sand, seemingly impassable for man or beast, nevertheless there are valleys in which caravans are able to jour with comparative facility. The basin between the two rivers is exc ingly rich in subterranean water, and the wells there are capable of irri ing as many as eight millions of date-palms.

The other oases of this part of the Sahara—Tuat, Gurara, Tidikelt, Figig—over which Marocco formerly claimed some authority, have la been brought under the control of the French in Algeria.

STATISTICS (*rough estimates*).

Area of Marocco in square miles		219,000
Population of Marocco	estimates vary from	3,000,000 to 9,000,000
,, Merakish	,,	60,000
,, Tangier	,,	25,000 to 30,000
,, Fez	,,	24,000 to 140,000

ANNUAL TRADE (*in pounds sterling*).

Exports	1,400,000
Imports	1,500,000

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II.—ALGERIA

By Lieut.-Col. Sir R. Lambert Playfair.
British Consul-General in Algeria.

Extent and Configuration.—The French colony of Algeria, bound on the west by Marocco, is comprised between 2½° W. and 8½° E. lon tude. Southward, the colony proper reaches to about 32° N. latitude,

eyond this the Saharan districts under military rule stretch to about 26°. part from these, the area is calculated at about 184,000 square miles.

Politically it is divided into three departments. Oran, which occupies e western part, contiguous to Marocco. Algiers, the central and most nportant department, which, owing to its closer relations with the countries n the northern shores of the Mediterranean, is the centre of European ommerce and colonisation. The third is Constantine, which forms the stern part next to Tunisia. The natural divisions of the country also e three : the Tell, the High Plateaux, and the Sahara ; but the political visions bear no relation to them.

The Tell is a strip of undulating, cultivated land, extending 50 to 150 iles inland from the sea, and forming the northern limb of the Atlas. his range, covered with splendid forests, containing fertile valleys, nd in some places arid steppes, stretches eastward from the ocean to hich it has given its name, through Marocco, Algeria and Tunisia, ecoming interrupted in Tripoli and ending in the beautiful green lls of Cyrenaica. The best known part of this mountain range is the strict called Kabylia, inhabited by a branch of the Berber race, who, nlike the Arabs, build stone houses, and cultivate their land with the re usually bestowed on market gardens. A less known but even ore interesting region is the Aurès range, overhanging the Sahara, nclosing fertile plains and valleys of great richness. These mountains e the highest in Algeria : Shellia has an altitude of 7,611 feet and ahmel is nearly as high. Another mass, within the Tunisian frontier, the wild and beautiful country of the Khomair, with great stretches oak forests interspersed with glades of cleared and cultivated land.

The region of the High Plateaux, extending from west to east, consists vast plains separated by parallel ranges of mountains. These terraces crease in height as they recede from the Tell, and again decrease as they pproach the Sahara. Cultivation is only possible, within narrow limits, localities capable of irrigation. It is covered with alfa grass and abunnce of delicate aromatic herbs well suited for rearing sheep and goats.

The Sahara consists of two very distinct regions which may be called e Lower and Upper Sahara. The Lower Sahara is a vast depression of nd and clay, stretching eastwards as far as Tunisia ; the Upper Sahara is rocky plateau frequently attaining a considerable elevation, extending on e west into Marocco. Moving sand occupies an extensive zone in both gions, but it does not cover one-third of the whole surface. The oases, gardens of date-trees (Fig. 438), with which the Sahara is studded, exist herever water is found ; that only is necessary to make the desert sand cessively fecund.

Geology and Minerals.—Space does not admit of full treatment of e geology proper of Algeria ; but some notice is necessary of the economic inerals. The ores of various metals are found in great abundance : lead e, more or less argentiferous ; copper, blende, calamine, antimony, chrome,

manganese and iron. Iron ore is the most important, and generally occur so near the surface that it can be worked in open quarries; nearly hal a million tons are exported every year, principally from Beni Saf, near th frontier of Marocco. Algeria is especially rich in decorative stones— marble, breccia and oriental alabaster, some of which is probably th finest that the world contains. It is worked near Kleber in Oran, an also at Ain Smara, near Constantine. Phosphate of lime of excellen quality and apparently inexhaustible quantity has recently been dis covered at Tebessa and in the south of Tunisia, and the industry ha been developed by the energy and intelligence of British subjects rousing much adverse comment from French and Algerian politicians who hold that foreigners should not be permitted to develop the in dustries of the country.

Hydrographic System.—The drainage area of the Tell is a regular as in other countries and its streams all reach the sea. Th most considerable are the Mafrag, the Seybus, the Wed-el-Kebir, th Makta, and the Shelif, which, during flood-time, discolour the water fo several miles at sea, but have not the strength in summer to force passage for themselves through the banks of sand accumulated in thei estuaries. With the streams descending from the southern slopes of th mountains, however, it is quite different. Some part of their waters i absorbed by irrigation in summer, but after the copious rains of winte they reach the Sahara, where they either form large open lakes calle shotts, which, owing to evaporation, become salter than the ocean, or the sink through the permeable stratum of sand till they come to an impermeabl one of clay, and thus form a vast subterranean reservoir. From tim immemorial artesian wells have been sunk in this district, and their water have everywhere spread life and wealth. The French have done splendid and beneficent work in multiply ing these wells wherever there was a pro spect of success. Between 1856 and 189 no less than 794 were sunk. In one part o the Sahara, the Suf, this water circulate close to the surface of the soil, conceale by a bed of sulphate of lime. One has onl to penetrate this layer of gypsum to creat a well. When it is intended to plant a dat grove the Suafa remove the entire crus and plant their palms in the water-bearin sand below.

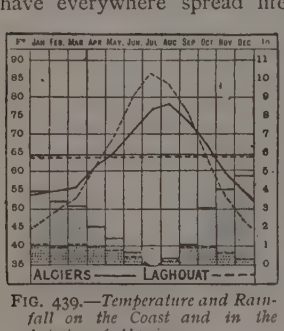

FIG. 439.—*Temperature and Rainfall on the Coast and in the Interior of Algeria.*

Climate.—The climate of Algeria, fo winter visitors at least, is certainly the finest in the Mediterranean, thoug not without a due proportion of wet and cold. The summer is rainles and extremely hot. From an agricultural point of view the seasons ar too variable: sometimes it is too cold, and the tender crops are killed b

t, or it is too hot and a blast of the sirocco destroys the produce of a yard in a few hours. On the coast frost and snow are exceedingly rare, on the High Plateaux and on the most elevated parts of the Tell the t is sometimes severe and snow lies long and deep; the highest peaks ne Atlas retain some snow as late as June. The extremes of climate ease towards the arid Sahara.

Flora and Fauna.—The flora and fauna of the eastern portion of eria do not differ essentially from those of Sicily and Sardinia, while the west they resemble rather those of Spain. Of the 3,000 plants nd in Algeria, by far the greater number are natives of southern ope, and less than 100 are peculiar to the Sahara, where Africa may aid to begin. Absolutely the same may be said of the fauna. There many mammals, fish, reptiles and insects common to both sides of the diterranean. The fish of the Tell and High Plateaux belong exclusively ne European system. Algeria possesses twenty-one species of fresh-er fish, of which five are peculiar to itself. The Sahara alone is linked he African system by its Chromidæ, which occur all over Africa as as Moçambique. It is by no means uncommon for fish to be ejected by sian wells; as they are not blind, it is concluded that they inhabit the terranean reservoir or sea, which occupies the bottom of the Saharan ression, and that they circulate between one open space and another.

Natural Productions.—Algeria is essentially an agricultural country, it is from its soil, in a great measure, that its riches and importance ceed. Owing, however, to the uncertainty of its seasons, periodical ught and increasing competition with more favoured regions, the cul-tion of cereals is yearly becoming less remunerative, although the ntity produced has increased, and the area producing it has risen from and a half to seven million acres in twenty years. Algeria is rapidly oming one of the principal wine-producing countries of the world. vine prospers everywhere, even on the worst land and in the driest rs. Everywhere, but especially on the littoral, excellent wine is duced, of infinite variety. All that is not consumed in the country xported to France. One of the most important of the vegetable urces is the Alfa fibre, properly called Hulfa, or Esparto grass. This ws spontaneously over vast tracts of country where cultivation of any l is impossible. Ten million acres are covered with it, yielding er-making material equal to three-fourths of all the rags used ughout the world. The amount exported, however, continues dily to decrease, owing to the increasing use of wood pulp. The face of forest land is about seven and a half million acres; and eria thus occupies the sixth rank amongst the forest countries of ope. The principal trees are cork-oak, several other kinds of Quer-, Aleppo and maritime pines, and the Atlantic cedar (*Pinsapo Thuya*), ch yielded the far-famed Citrus wood of the ancients. The most attrac-forests are those of cedar, a never-ceasing source of pleasure to the

traveller, but hitherto they have proved of no very great commerci importance. The cork forests have an area greater than those of Spai though not quite equal to those of Portugal, and much less productive.

People and Language.—Numerically the most important class the native population are the Arabs, who date back to the Arab occupati of the country in the twelfth century ; they took possession of the mo accessible districts and drove the original owners, the Berbers, into the mountain fastnesses. They are essentially a nomad race, living in ter which they change from place to place as the pasturage around them consumed. The term Moors, at the present day, is one of Europe invention, and is generally applied to Arabs who live in fixed habitation The Arabs who reside within the sphere of French influence ha acquired a certain varnish of civilisation, but the great mass of t population are now as they were in the days of Ishmael, and such are th likely to continue for generations. The Berbers constitute a division the great aboriginal race which inhabited North Africa as far as the R

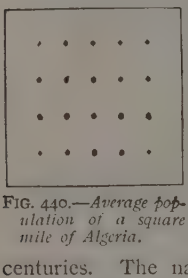

FIG. 440.—*Average population of a square mile of Algeria.*

Sea. They live in the more inaccessible mounta regions. The chief branches are the Kabyles of Ju jura, numbering about 200,000, and the Shauia of t Aurès, whose name is derived from the Semitic ro Sha, a sheep ; they have few or no cattle, but immen flocks of sheep and goats. The Jews are said to ha established themselves in Algeria after the destructi of Jerusalem by Titus, but it is more probable th they did so after their expulsion from the vario parts of Europe in the fourteenth and fifteen centuries. The native languages are a more or less corrupt form Arabic, spoken by Arabs and Jews, and Berber by the Kabyles, Shau and other mountain races. Berber is the speech of over two-thirds Marocco, and may be traced everywhere in the Sahara almost as far Senegal. It has no written character, and all the "literature" it po sesses is transmitted orally. The Shauia dialect is full of Latin word and in their daily life the people retain customs undoubtedly derive from the admixture of Latin races in their ancestry. They use the sol instead of the lunar year, and their names for the months are hard different from those in use in Europe.

Government.—When the French army, by a bold stroke, toc possession of Algiers in 1830, France was as much surprised as the re of the world. The expedition was sent to avenge an insult, and no or contemplated the creation of a magnificent colony. The first part of th modern history of Algeria was purely military, but as security began to b established, European colonisation followed rapidly. The government the colony has undergone a complete transformation of late years. Fo merly the Governor-General united in his person the chief civil and militar authority. Now an entirely civil *régime* has been introduced. Each of th

ee departments is governed by a prefect as in France, but under the reme authority of the Governor-General, who is assisted by a Council of ernment; there is also a superior Council to which delegates are sent each of the Departmental Councils. Each of the three departments ds one Senator and two Representatives to the Parliament in Paris.

The military forces consist of the 19th Army Corps of France; a tion of territory in the extreme south is still under the government of commander-in-chief of this corps.

Industries and Trade.—Algeria can hardly be said to be a manu-uring country. A few objects, such as carpets, blankets and pottery, produced by the Arabs, principally for their own use, but these are ch sought after by European residents and visitors. The breeding of ep is one of the principal employments of the native population the High Plateaux. Although there is abundant pasturage for a ger number, it is impossible greatly to increase the stock owing to the rcity of water during summer.

The external trade of Algeria is almost entirely with France, all other ntries together only participating to the extent of 10 per cent. of the l. The chief exports are cereals, esparto grass, tobacco, iron-ore, wine, cork; the chief imports are manufactured articles, coal and coffee. Algiers is an important coaling station for vessels trading in the diterranean, and its value in this respect is increasing.

Communications.—The railway system has made rapid progress of years. The aim of the administration is to have a central line from his to Marocco, passing through the most important points in the erior, and various subsidiary lines joining this with the sea. This has n almost completely carried out. The roads are magnificent, such as nation but the French seem able to construct, and they are nearly three es the length of the railways.

Towns.—Commencing from the frontier of Marocco, the towns along coast are, *Nemours*, *Oran*, the capital of the province, with an excellent bour, *Arzeu*, *Mostaganem*, *Ténès*, and *Cherchel*. *Algiers* is the capital of central province and of the entire colony. The modern town consists regular streets and squares, fine public buildings and excellent hotels. e old town, inhabited chiefly by Arabs, lies on the steep hill behind the dern one, in the form of an irregular triangle, the apex of which is old Turkish kasba or fortress. The streets are narrow, tortuous l irregular, joined together by alleys, in some of which it is barely sible for two men to pass. One of the principal features of these old ab houses is that, rising as they do, one above the other, and covered h flat terraced roofs, a magnificent view is obtained from them of city, the harbour and the distant mountains. Under the Turkish ernment the roofs were reserved for the women alone, who used to visit h other by climbing over the low parapet which divided the houses. e inner harbour of Algiers was originally constructed by Kheir-ed-din

in 1518, by connecting the island on which the Spanish lighthouse sto and still stands, with the mainland by a causeway. The present harbo is French ; it is interesting as the first ever constructed with blocks concrete. The environs, especially *Mustapha Superieur* and *El-Biar*, covered with beautiful villas and splendid hotels, greatly frequent by English and other visitors in the winter season.

To the east of Algiers are the towns of *Delys ; Bougie*, with a fine natu harbour, situated amidst magnificent mountain scenery ; *Djidjelly ; Col Philippeville*, one of the ports of Constantine, with a splendid artific harbour ; *Bône*, the ancient Hippo Regius, the home of St. Augustine, a possessing a fine harbour. Both the last have railway communication w Constantine ; and lastly, *La Calle*, a town of considerable interest, as it w here that the French first established themselves in 1520.

The towns in the interior, again commencing from the west, *Tlemçen*, the Roman *Pomaria*, a place not unlike and at one time hard less celebrated than Granada, or inferior to it in beauty of situation architectural interest. Next come *Sidi Bel Abbès ; Mascara*, with memories of Abd-el-Kadir ; *Tiaret ; Orleansville*, on the line of railway fr Oran to Algiers ; *Miliana ; Blida ; Setif*, on the High Plateaux, and *Co stantine*, the "Lordly Cirta," always an important natural fortress, whe Syphax and Masinissa reigned, where Sophonisba died by her own ha where St. Cyprian was exiled, and the scene of the two most importa operations of the many undertaken by the French armies. In point scenic beauty and grandeur, probably no town in the basin of t Mediterranean can equal it. South of it, on the border of the desert, *Biskra*, now becoming very popular as a winter station ; it is practica rainless, but it has not the beautiful scenery and the amenities of li which make Algiers so pleasant.

The most prominent fact that meets one at every turn is that Fran has been transported to Africa ; the whole country is covered with Fren towns and villages, and foreigners are held in disfavour, although t foreign element has played a most important part in the colonisation the country, and even now, if the Spanish, Italian and Maltese elemen were eliminated, work would be at a standstill. Another fact that strik the stranger is the permanence and solidity that pervades everythin The railways are constructed as well and expensively as in France, t roads are unsurpassed in any country, and the hydraulic and irrigati works are splendid in their conception.

STATISTICS.

	1886.	1896.	1901.
Area of Algeria (square miles)	184,474	184,474	184,474
Population	3,817,306	4,429,421	4,739,331
Density of population per square mile..	21	24	26
		(1891)	
Population of Algiers	74,792	82,585	96,742
" Oran	67,681	74,510	87,801
" Constantine	44,960	46,581	41,138
" Bône	29,640	30,806	32,288
" Tlemçen	28,204	29,544	22,273

COMPOSITION OF POPULATION OF ALGERIA.

Races.	1886.	1891.
French	219,627	271,101
Jews	42,595	47,564
Algerian and Tunisian Mohammedans	3,260,376	3,554,907
Moroccans	17,445	18,017
European Foreigners	203,153	218,201
Total	3,805,684	4,109,650

ANNUAL TRADE OF ALGERIA (*in pounds sterling*).

	1871-75.	1881-85.	1891-95.
Exports	5,800,000	5,900,000	10,200,000
Imports	7,800,000	12,400,000	9,200,000

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III.—TUNISIA

By Sir Harry H. Johnston, G.C.M.G., K.C.B.,

At one time British Consul-General at Tunis.

Position and Surface.—Tunisia, the ancient Roman province of frica (still called "Ifrigiah" by the natives), is the most northerly pro-ction of the Dark Continent. It is the most easterly prolongation of true orth Africa—that is to say, of all the temperate, fairly well-watered gions north of the Sahara desert.[1] Tunisia is divided into four fairly stinct regions—Tell, Sahel, high Tablelands, and Sahara (desert). he Tell is the name generally given to the well-watered and well-wooded ountainous country in the north of Tunisia, lying between the valley of e Majerda and the coast of the Mediterranean, between the frontier of geria and the Gulf of Tunis. Sahel—literally coast lands—is the less ell watered but still fertile eastern littoral of Tunisia, from Cap Bon to e frontier of Tripoli. The interior tableland, of an average altitude of 00 feet above the level of the sea, lies to the north of 35½° N., and tends to the valley of the Majerda. This district is watered by no erennial stream, but has a rainfall usually sufficient for raising grain crops d maintaining pasturage. The real Sahara desert lies to the south of is tableland and to the west of the narrow coast belt. A most important d interesting region of Tunisia is that round the dried-up salt lakes, in e south—the Belad-al-Jerid, or Country of Date Palms, an Arab name ally restricted to a very small portion of Tunisia, but made to cover a vast

[1] The adjoining vilayet of Tripoli, which lies much further to the south, is entirely haran in character, but beyond Tripoli again there is the northward projection of Barka (ancient Cyrenaica), which in some degree reproduces the characteristics of northern nis, Algeria and Morocco.

area of the interior of Africa on maps of the eighteenth century. The
salt lakes, which now contain scarcely any water, are supposed to be a f
fee below the level of the Mediterranean, and almost certainly represen
very ancient incursion of that sea. In the vicinity of these lakes innum
able springs gush from the limestone rocks and low hill ranges ; some
them are cold and salt, and others are boiling-hot and fresh. Former
no doubt these springs, which actually form running rivers, filled up t
salt-covered depressions with water ; but for several centuries past the b
fresh water, which predominates in quantity, has been almost entire
used up for the irrigation of immense forests of date palms, orchards
fruit trees, and plantations of vegetables. There is only one perenn
running river of any importance — the Majerda (Makar of the Carthag nian
and Bagrada of the Romans), which rises in eastern Algeria, and flo
right across northern Tunisia to the sea at Porto Farina.

The mountains in northern and western Tunisia are a prolongation
the Atlas Range. The greatest height attained is under 7,000 feet.
rather isolated and notable mountain (for picturesqueness) is Mou
Zaghwan (5,500 feet), forty miles south of Tunis, and the source of wat
supply to that town now, as in Carthaginian and Roman times. The rath
high mountains of the Tunisian Sahara (5,000 feet at most) are really t
remains of an ancient plateau, and are mostly table-topped.

People, Trade and Government.—The really native populati
possibly reaches to 1,800,000, and consists mainly of Arabs and Berber
The non-Tunisian or European Christian population attains a total
about 100,000 ; 50 per cent. of them are of Italian nationality, near
30 per cent. French and the remainder chiefly Maltese, with over 1,0
Greeks.

The occupation of the native population is almost entirely agricultura
Wheat is grown in the north and centre, barley in the east and sout
Camels, horses, cattle, sheep and goats are reared in large numbers.
considerable area of the country is planted with olive-trees, the olive oil
Tunisia being the finest in the world. The extreme south also produc
the best dates known to commerce. The forests of the north-west yie
cork of good quality, and the steppes bordering on the Sahara gro
quantities of esparto grass. In the towns are important manufactures
carpets, and a little weaving of silk.

About 60 per cent. of the total trade is carried on with France an
Algeria. The United Kingdom and Malta have about 13 per cent. of th
trade, Italy about 11 per cent., and Russia, Belgium, Austria, Tripol
Scandinavia and Spain the remainder.

In the sixteenth century the native Berber dynasty of the Hafsides wa
displaced by Turkish invasion, which gradually settled into the militar
despotism of a Bey.[1] From the beginning of the eighteenth century th

[1] Bey.—Colonel. The Bey was the commander-in-chief of the Turkish garrison.

rkish family of Hussein reigned over Tunis as hereditary satraps of rkey until 1881, when the country was placed under the protectorate France. Since that time, although the Bey is still maintained as er, the country is practically governed by France through a Resident-neral.

Towns.—The capital of Tunisia is *Tunis*, a city existing from before historical period, at the head of the gulf of that name. Tunis is parated from the sea by a shallow salt e, originally the embouchure of the Ma-da River. Through this lake the French ve cut a maritime canal which brings nis within easy access of the sea. The of Carthage is situated about twelve es to the north-west of Tunis. The town t in importance is *Sfax*, on the south-t coast of Tunisia. *Bizerta*, in the most thern part of the country, is at the mouth a large and deep lake, and has been de by the French into a great military port. An interesting city to t is the formerly sacred town of *Kairwan*, the original Mohammedan pital, founded in the eighth century. *Gafsa*, in the south, is an old man city with wonderful hot springs. *Gabes*, at the head of the gulf that name, possesses a short but perennially running river, and is sur-nded by an oasis of extraordinary fertility and beauty. The Island of ba, lying to the southward of Gabes, is supposed to be the island of the us Eaters of the ancient Greek poets and geographers. In the Gulf of pes the Mediterranean exhibits tidal influence to a considerable extent; places along the coast of Jerba the highest rise and fall of the tide is en feet. Tunisia is celebrated, or should be so, for its wonderful man ruins. These are chiefly remarkable at Dugga, in the valley of the jerda, at Sbeitla (the Roman Suffetula), at Feriana, at Gafsa, and at ious other places in the Jerid, at Zaghwan, and finally at El Djem, ich has the second largest amphitheatre in the world.

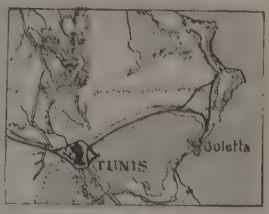

FIG. 441.—*The Site of Tunis.*

Railways.—The Bone-Guelma Railway Company of Eastern Algeria ns all the railways in Tunisia except the line from Sfax to Gafsa. The in line of the Bone-Guelma Railway runs from Sûk Ahras in Algeria vn the valley of the Majerda to Tunis, with a branch to Bizerta, and h other branches to Zaghwan, Susa, Kairwan, &c. A light mineral rail-y has also been built connecting Sfax with Gafsa to work important posits of phosphates.

STATISTICS.

Area of Tunisia (in square miles)	51,000
Population of Tunisia, approximately	1,900,000
Density of population per square mile	37·2
Population of Tunis	180,000
„ Sfax	[illegible]

APPROXIMATE COMPOSITION OF THE POPULATION OF TUNISIA.

Berbers more or less of pure race, say	500,000
Arabs, say	500,000
Mixed Arab and Berber peoples	500,000
"Moors" (chiefly the population of the principal cities, of mixed Berber, Roman, Spanish-Moor, and Christian-slave races), say	100,000
Jews, say	100,000
Sudanese Negroes, natives of Marocco, Algerians, and Turks, say	100,000
Europeans, say	100,000

AVERAGE ANNUAL TRADE (*in dollars*).

	1896–97.
Exports	7,100,000
Imports	9,220,000

IV.—TRIPOLI

By Prof. John L. Myres.

Position and Surface.—Tripoli includes all the north coast o Africa between Tunis and Egypt, with its hinterland as far south as Rha and Fezzan, but the land frontiers are ill-defined. The coast is parted b the Gulf of Sert (the ancient *Syrtis major*), into Tripoli proper and Barka in each division a limestone plateau approaches the sea, giving rise t milder climate, greater rainfall, and fertile coast plains of varying extent The plain of Tripoli (Jefâra) narrows from 70 miles south of Zuara to 3 miles behind Tripoli, while west of Khoms broken highlands reach th coast. The narrow Meshiya belt round Tripoli and Tajura is irrigate from wells, but the rest is now uncultivated, and parts are sandy desert East of Khoms the coast land is more varied, but the coast of the Gulf o Sert is quite barren. The plain of Tripoli is abruptly bounded by th limestone scarp of Jebel Nefusa, Yefren, and Gharian (2,000 feet), and th Tarhuna plateau. This hilly country is intersected by dry river-bed running towards the north-east. The Hamada el Homra, a very leve waterless plateau of red sandstone (1,500 to 1,650 feet) separates Ghadame and Rhat from Fezzan. East of the Hamada the volcanic Jebel es Sod and Haruj es Sod divide the coast steppe of Sert from the limestone Heru el Abiad of northern Fezzan. To Fezzan also belong the oases of Jofr and Zella at the northern foot of the volcanic range. Barka is a diversifie limestone tableland, rising seawards, and in the west to 3,300 feet (Jebe Akhdar), cut off from the south by the white desert (Barka el Beida), an fringed by coast plains of red alluvium. There are cavernous ravines wit dense vegetation near Benghazi; otherwise the ancient forests have disap peared. The ruins of Ptolemais and Kyrene occupy strong positions o spurs of the plateau: the "Fountain of Apollo," which fertilised the latter still flows (Ain Shehat), and similar streams from beneath the escarpment water the gardens at Derna. South of the plateau lies a depressed area barren except for the oases of Augila, Faredgha, the headquarters of the Senussi sect, and Siva, which, however, lies in Egyptian territory.

Climate.—In the coast plains the mean annual temperature is about F. A daily sea-breeze is experienced, diversified by occasional storms ain from the north-west and of sand from the south-east. The winter ms make all the ports unsafe. In Barka the mean temperature is a e higher, with from 14 to 20 inches of winter rain. In the interior rain s rarely, and the mean temperature rises to 82° F. in Fezzan, and 86° in a, but with severe cold at night and even occasional snow on the hills. avy rain falls in early spring in Fezzan, but everywhere the normal er supply is subterraneous.

The date-palm grows wherever there is water, olives in some places, onds at Ghadames, and halfa (esparto grass) on the coast moors.

People and History.—The population is throughout fundamentally ber, but Jews have been numerous since Ptolemaic times in the coast ns. The Arab conquest modified many tribes profoundly ; and Negro nents, due to slave traffic, predominate southwards. Europeans, chiefly ians and Maltese, are seen only in the coast towns, and Turks only he garrisons and among the higher officials. Arabic is spoken every- ere ; but Berber dialects survive, and Hausa is spreading along the avan routes. Tripoli is named from the "Three Cities"—Sabrata (Zuara), (Tripoli), Leptis (Lebda)—which were founded by the Phœnicians, but r came under Greek influences, and passed subsequently into the hands he Romans. In the Roman period agriculture flourished even inland, nks to elaborate water storage in the gorges of the plateau, of which quent traces remain. Other Roman remains are numerous, testifying to immense prosperity of the land before the Arab conquest. Tripoli was upied by Spain under Charles V., and the Arab dynasty was finally osed by the Turks in 1835. Barka entered into very early relations n Greece. Kyrene, the first colony, was founded in 631 B.C., and formed, h Barka and three other towns, a "Pentapolis," which in the fifth and rth centuries B.C. rivalled Carthage in prosperity ; then became subject Egypt ; and was bequeathed to Rome in 95 B.C. But the Silphium plant the pastures, on which its wealth depended, were already disappearing, the Arab conquest completed the ruin.

Administration and Towns.—Tripoli is a Turkish vilayet, formerly uding Barka, which, since 1873, has been administered separately. *oli* is a walled town, the seat of the Vali and the principal garrison, h an open harbour, extensive palm groves, and important market. It is terminus of caravan routes across the desert—(1) *viâ* Ghadames to at and Timbuktu, and to Rhat, Kano and Sokoto ; (2) *viâ* Sokna or ha to Murzuk, and so to Bornu, Wadai and Darfur ; (3) *viâ* Sokna and la to Aujila and Siva. It imports manufactured articles and objects of ter for the caravans, and exports ostrich feathers, ivory and skins from Sudan ; gold dust from Twat ; halfa from the coast hills ; dates and a cattle and horses from the littoral ; and baracans, goat-cloth and other iles. *Benghazi*, the capital of Barka, has a small trade, chiefly with

Malta, in wool, cattle, corn (in good years), salt, sponges and a little ivo
The sponge fisheries are almost wholly in Greek hands. *Ghadan*
(ancient *Cydamus*), 300 miles south-west of Tripoli, lies between
north-west border of the Hamada el Homra and the Algerian desert, in
oasis watered by warm springs, and enclosed by a ruinous rampart. T
population is Berber and devoted to trade. *Rhat*, in a similar oasis so
of Ghadames and 540 miles from the coast, is inhabited mainly by
Tuareg, and is the principal halt between Ghadames and Kano. *Murz*
a walled town in one of the central oases of Fezzan, is the principal
on the eastern route, and the junction with a route from Rhat to Zella
Aujila.

STATISTICS (*Estimates*).

Area in square miles	400,000
Population	ca. 800,000
Density of population per square mile	2
Population of Tripoli city	30,000
" Benghazi	15,000

V.—EGYPT

By W. F. Hume, D.Sc., A.R.S.M.,
Egyptian Geological Survey.

Position and Extent.—The political boundaries of Egypt cannot
yet, be quite definitely stated. To the north, in latitude 31½° N.,
Mediterranean forms its natural frontier; to the west it is limited by
indefinite line, generally west of longitude 25° E. through the waterl
deserts of the Sahara; to the south, the provinces of the Sudan, wh
were in revolt under the Khalifa, extend to about 6° N latitude; while
the Galla country, Abyssinia, Eritrea and the Red Sea, form the east
border. To the north-east, the Gulf of Akabah, and an ill-defined
running from the port of Akabah in longitude 35° E., through the De
of the Wanderings to Wadi Refah on the Mediterranean, separate Eg
from Asiatic Turkey.

Thus Egypt, in its largest acceptation, has a length of over 1,800 mi
from near Alexandria to the borders of Uganda, and a maximum brea
of 800 miles in the latitude of Khartum. Its northern half, as ab
defined, belongs to the belt of desert which stretches from West Afr
to the centre of Asia, while the southern portion is occupied by gra
plateaux or wooded regions of enormous extent, which are watered
numerous tributaries of the Nile. Only between the river and the
Sea, and in Sinai, does the height above sea-level much exceed 2,000 f
the higher mountains of the Arabian desert attaining elevations of fr
5,000 to 7,000 feet, while in Sinai the principal peaks are over 8,000 feet

Geology.—The Egyptian Sudan and Nubian desert form part of
central core of Africa, characterised by the presence of igneous
metamorphic rocks, which, extending into the Arabian desert, give

the mountainous region of the Red Sea Hills. The lower parallel
ges of Jebel Esh and Jebel es Zeit on the western, and a long ridge
the eastern side of the Red Sea, together with the principal chains of
Sinai peninsula, are of similar character. The predominant rocks are
nites, gneisses, felsites, and dolerites, the hills produced by the first
ntioned being particularly characterised by ruggedness of outline and
epness of slope. These are in almost all cases overlaid by a compact
dstone passing into softer sandy beds above, the Nubian Sandstone.
om Assuan to Jebel Silsileh the Nile cuts through this formation, which
s in high cliffs on both sides of the river, and extends some distance
o both eastern and western deserts. Thus it is known to the south-
st of the Khargeh and Dakhel oases, to the east, and has also been
rked by the Egyptians on the Kena-Kosseir road to the west. To the
th the sandstone is succeeded by the plateau-forming limestones, and
ng to their low dip to the north-west younger and younger strata come
he surface in that direction ; these are mainly of Eocene age, except in
desert near Suez, where representatives of the Miocene and Pliocene
also present. The western desert is also largely Eocene, but in the
es and on the Nile, near Esneh, Upper Cretaceous limestones have also
n recorded. Contrary to the former belief, it has lately been found that
Eocene strata rest unconformably on the Cretaceous. The same
cession of sandstone overlying the igneous and metamorphic rocks, and
ceeded by Cretaceous and Eocene limestones, is also observed in the
bian desert and in Sinai. In Sinai and Wadi Arabah the Nubian
dstone has been found to contain Carboniferous fossils, but the main
ss has by different authors been regarded as Triassic, Cretaceous, and
cene, the lack of organic remains rendering the determination difficult.

Climate.—Owing to the diversity in its surface features, the climate
Egypt is of very varied character. In the equatorial lands of the
thern Sudan the rainy season lasts for ten months, and even in
vember and December, the dry period, storms are not infrequent. In
tude 8° N. the dry seasons are separated by two rainy periods, a light
a heavy ; the former lasting from March to April, while the latter
ins about the middle of May, and often continues far into October.
even in the wet season the thunderstorms and showers do not last
g, though recurring constantly after the midday heats. Further north,
ween Khartum and Shendi, the rainy season is much shorter, while in
per Egypt and parts of the western deserts rain is almost unknown.
is there is a transition from regions of excessive rainfall to those
bsolute rainlessness. The presence of the Mediterranean on the north
the high mountains in Sinai and the Red Sea Hills, to some extent
rease the rainfall in their immediate neighbourhood. Thus the mean
fourteen years at Alexandria is eight inches, at Cairo only one and a-half,
at Kina practically nil, the rainfall thus obviously diminishing with
ance from the sea.

In the Sinai peninsula sudden thunderstorms are not infrequent December, January and February, accompanied by a heavy downpo the dry torrent beds becoming suddenly flooded, thereby occasiona causing much destruction to life and property; while on the high summits light falls of snow and the formation of ice are frequen observed. This range forms a protection to the Arabian desert, in wh hills these sudden storms are rare and less destructive, no important ra having fallen between 1892 and 1898. The air of the desert is dry a invigorating, and contrasts with the comparatively damp atmospheres Cairo and Alexandria, but especially with the moist conditions of the Sud

In northern Egypt the winds blow for the greater part of the year fr the north and north-west, the latter sometimes lasting for a month with intermission, while from February to June south-easterly and sou westerly winds are more prevalent. During these months the Khan —a sand-laden, dry wind—blows at frequent intervals, and is alwa accompanied by a marked rise of temperature. The temperature is low from the end of December to March, the lowest recorded in the Delta bei 35° F., in Alexandria 40°, in Cairo 31°, and in Upper Egypt 41° F. the desert the temperature frequently falls below freezing point; in Sin at a height of 5,000 feet, 15° of frost having been recorded, and in t Libyan desert 23° F. The heat begins to increase in April, but f summer usually commences in June, when temperatures between 80° a 90° F. are the rule, even at midnight. The ten years' mean average f the Delta and Cairo is 58° F. in winter, 78° F. in spring, 83° F. in summ and 66° F. in autumn, while during the period of hot winds as much 114° F. in the shade has been recorded. Further south 109° F. in the sha has been observed in Upper Egypt, while in the oases and the Sudan t temperature occasionally rises to over 120° F.

The Nile.—The whole country is watered by one river-system—th of the Nile. Rising between 2° and 3° S., where several branches unite form the Kagera, it flows through the Victoria Nyanza, and entering t northern end of the Albert Nyanza immediately flows thence as the Bah el-Gebel. In about 9° N. this river is joined by the sluggish Bahr-e Ghazal, or Gazelle river, draining the Bongo and Niam-Niam countri on the west, and by the more rapid Sobat, rising in the Galla highlands the east. The joint streams form the Bahr-el-Abiad, or White Ni which meanders northward through the grassy plains, or dense thick and forests of the Sudan. About 16° N., where Khartum stands, receives one of its most important tributaries—the Bahr-el-Azrak, or Bl Nile, a rapid and turbulent torrent, descending from the southern hig lands of Abyssinia. Still further north, 180 miles below the confluen the Nile is joined near Berber on the east by the Atbara, which drai the northern highlands of Abyssinia. From this point onward the N assumes those characteristics which have made it the most remar able of rivers, flowing for a distance of 1,800 miles without receivi

single affluent, and running in a valley which is simply a cleft in the sert plateau, the cliffs on both sides of its alluvial plain rising in many ses to a height of over a thousand feet. The maximum breadth of the er below Khartum is not more than 1,100 yards (near Minieh and Cairo spectively), except during the period of flood, while the "cultivation," or d which is subject to the influence of its fertilising waters, does not ceed nine miles in breadth at any point. The actual Nile valley, how-er, is much broader, in parts of Egypt proper being over thirty miles width, but narrower in Nubia, where five to six miles is a fair erage. The river itself is navigable throughout its whole length, except ien it issues from the Albert Nyanza in a series of rapids near Wadelai, d at the six Cataracts, between Khartum and Assuan, where it has forced way through granite and syenite barriers.

The long, narrow valley terminates at Cairo, where the Nile branches

FIG. 442.—*The Delta of the Nile and Suez Canal.*

inly discharging its waters at the present time through two channels, ned—from the towns where they enter the Mediterranean—the Rosetta d Damietta branches. The district included between these two arms s called the *Delta* by the Greeks from its resemblance to the Greek letter he apex of the triangle being at Cairo, and the base the Mediterranean ore line between Alexandria and Port Said, over 150 miles in length, e area thus defined embraces the most fertile region in all North Africa, Thus there are three geographical divisions dependent on the character the Nile itself:—(1) The Egyptian Sudan, including all the country th of Khartum; (2) the Nile Valley; and (3) the Delta. There are in lition two vast desert regions, separated by the Valley of the Nile, and

standing in sharp contrast to one another :—(4) The Libyan Desert on t
west ; and (5) the Arabian and Nubian Deserts on the east.

The Nile Floods.—In the Nile valley the seasons are determined
the rise and fall of the river, these movements depending on the amou
of rain which falls in the Abyssinian highlands. The waters begin to ri
in the upper reaches in the beginning of June, the rise being observed
Cairo three weeks after it has commenced at Merawi. In early Octob
the maximum elevation is obtained, forty-one feet above ordinary Ni
level being at present the most favourable for agricultural purposes.
the annual occurrence of the inundations depends the existence of t
Egypt of history and commerce ; its prosperity is due to the soil th
brought down from Abyssinia, which, distributed over the alluvial plain,
the source of the great fertility of this portion of the country.

The insoluble material in Nile mud is remarkable for the uniformity of
grain, the particles being very minute. The coarser minerals, which ther
selves are minute, are mainly such as would be derived from igneous rocks
viz., quartz, felspar, hornblende, and epidote, and recent borings ha
shown that the delta mud, which is itself of great thickness, is underlain
thick beds of gravel containing pebbles of limestone, granite and andesi
clearly indicating a period of greater rainfall and more abundant torre
action in the past. Indeed, it has been held by many geologists that t
Nile was formerly a negative delta, or narrow arm of the sea, and it is
noteworthy fact that the deepest borings undertaken in the Delta (375 fe
at Zagazig) have never yet reached bed-rock.

The construction of a great storage reservoir for the surplus flood wate
by building a dam across the Nile valley above Assuan was completed
1902, and so a regular supply for irrigation in the lower valley and in t
Delta during the period of low Nile has now been secured.

Natural Resources.—For many centuries Egypt was practically th
granary of the Byzantine Empire, and wheat still plays an important pa
occupying 50 per cent. of the fields in Upper Egypt and 30 per cent. in t
Delta, and in the extent of its cultivation rivalling maize and durrah,
Indian millet. Clover, beans and barley are also grown, but in recent yea
cotton has tended to become the one crop of economic importance. Th
cereal crops are usually sown between the middle of October and end
December, and harvested from the middle of February to the end of Apr
the seed time and harvest being earlier in the southern than in the northe
provinces. Cotton and tobacco are chiefly cultivated in Lower Egypt fro
April to August ; cucumbers and water-melons also form an importa
local staple. Of recent years rice and sugar-cane have been introduc
with success, the moist lowlands of the Delta being especially favoural
to their development. Flax, henna, indigo, and castor-oil are also produce
flax forming a not unimportant article of export.

Among fruit trees, the date palm holds the first place, groves of this tr
extend along the banks of the Nile as far south as Fashoda, and it is grown

oases and even in the wild valleys of the Sinai peninsula, but the dates duced are mainly for home consumption. The vine, orange, mandarin, on, melon and fig are also plentiful in the Nile valley, while bananas cultivated in the Sudan. The trees most common in the Nile valley and oases are the date palm, the *Acacia Nilotica*, or sunt, and the sycamore. he oases the two former are present, and the dates obtained are superior hose of the rest of Egypt. The Sinai peninsula is also not so barren as enerally supposed, the date groves of the Wadi Feiran being especially king, while tamarisk bushes abound in the principal valleys; nor is the bian desert devoid of vegetation, tamarisk and scattered examples of the ny acacia (*A. seyal*) and *Majinga* being found in the high mountain eys. In the Sudan, on the contrary, forests are frequent, but of mixed racter.

The chief domestic animals employed in transport are the camel, donkey, se, buffalo and ox, while flocks of goats and sheep, especially the long-ed *kharûf*, constitute an important source of wealth. The lion and pard are now almost restricted to the Sudan, but a few leopards are met h in the peninsula of Sinai. The hyæna and jackal lurk in the old ns and caves of the plateau limestone, while the long-eared fennec fox ot uncommon in the desert. The ibex (*I. sinaiticus*, bedan, or tetel) is ited to the mountains of Sinai and the Arabian desert, various species antelope and gazelle also wandering in the lower desert valleys. The phant, hippopotamus, chimpanzee and other apes, and the giraffe, only ur in the Sudan, while the crocodile is now very rare north of Assuan. d grouse, red partridge, and quail are of frequent occurrence in desert, while geese, wild pigeon, and duck yield sport in the Nile ey. The flamingo, ibis, sultan bird, and heron also breed in the Delta l the Fayum. In the Sudan the ostrich in the desert, guinea fowl in the ods, waders, darters, and cranes on the upper reaches of the river, form t of the varied life of the tropical regions.

The mineral resources are at present of secondary importance. Ala ter has been quarried near Assiut. But the ancient Egyptians sought st of their monumental stones further to the south, the sandstones, rites, &c., used in many of the large temples being quarried on the na-Kosseir road in the Arabian desert, and the granite from the quarries r Assuan. The Romans, too, busily searched this eastern desert, ex-iting the beautiful red porphyry of Jebel Dokhan and granites of Mons udianus, near 27° N. Nor less famous are the now unworked emerald nes of Jebel Zebara, and the turquoise and copper mines of Maghâra l other places in Sinai, which were once the centres of an active Egyptian ning industry. In addition Jebel Zeit, on the Red Sea, was, within ent times, exploited for petroleum. Speaking generally, however, the mines at present add nothing to the resources of the country.

Ancient History.—The records of Egypt that have been preserved on nument and temple go back to so remote an antiquity that it might be

said the dawn of the history of Egypt is the dawn of history itself. It i remarkable fact that not only was the Egyptian Empire the most ancie but it was likewise the most durable the world has ever seen, with c exception being unaffected by foreign invasion over a period exceedi two thousand years. The explanation of this continuity is to be fou in the geographical position of Egypt itself, the sea in the then state navigation being an efficient protection on the one hand, and the des an effectual barrier on the other.

Menes, the founder of the first historical dynasty (in 4400 B.C., accor ing to Brugsch), founded Memphis, near the site of modern Cairo, whi occupied a strategical position commanding the Delta and the valley of t Nile. Commencing with this monarch, historians have grouped t Egyptian sovereigns, as recorded on the monuments, into twenty-s dynasties, lasting till the Persian invasion. Civilisation was already high developed, especially as regards architecture and engineering. Cheop Chephren, and Mykerinos, of the later dynasties, are well known as t builders of the three great pyramids of Ghizeh. Under the XIIth dynas Thebes became the capital, and Amenemhat III. was the first to utilise t inundation of the Nile, by constructing Lake Mœris in the low-lyi Fayum ; it was also at this time that the sceptres of Upper and Low Egypt were united (2466 B.C., Brugsch). The one interruption in the lo line of Egyptian kings was a successful invasion by an unknown Easte race, who founded the two dynasties of the Shepherd Kings, or Hyks (XV. and XVI.), and it is during this period that Joseph is believed have been in power. The Theban kings of the XVIIth dynasty e pelled the invaders, but it was during the XIXth that Egypt reached i greatest development, Rameses II., supposed to be the Pharaoh of t Oppression, extending his sway south to Dongola, and north to Asia Mino

During the reign of Tirhakah the Ethiopian (XXV.) Memphis fell int the hands of the Assyrians, who set up creatures of their own in Low Egypt. This was regained by Psammeticus I., founder of the XXVIt dynasty, with the aid of Greek mercenaries. Nevertheless, this tem porary foreign conquest was the first sign of decadence in the ol empire, which in 525 B.C. fell under the Persian domination of Cambyse A century later the Egyptians again reasserted their independence, but i 340 B.C. the Persians gave the death blow to the ancient monarchy. Th renewed Persian rule lasted but six years, when Alexander the Great too possession of the country and founded Alexandria, which soon became th centre of Greek culture and of the commerce of the then known worl On the division of the Macedonian kingdom at the death of Alexande one of his generals founded the dynasty of the Ptolemies, which lasted 42 B.C. With the death of Cleopatra after the battle of Actium, Egyp became part of the Roman Empire under Augustus, with which it was con nected from A.D. 27 to A.D. 395, when, on the partition, it was merged wit the Eastern or Byzantine dominions. The most notable feature during th

oman occupation was the rapid spread of Christianity and monasticism in e country, while somewhat later a Christian kingdom arose in Nubia.

Modern History.—In 638 A.D., only sixteen years after the flight of e Hejira, Amr-ibn-el-Asi conquered Egypt and started the Mohammedan-ab domination, which lasted for about nine hundred years, the country ring the rule of the Fatimite sovereigns (969–1171) being in an especially urishing condition. In 1240 Melik-el-Salah founded the Mameluke nasty, having been placed on the throne by the Mamelukes, descendants slaves who formed the bodyguard of the Caliphs, but in 1517, on the position of Tumân Bey, by the Sultan Selim I. of Constantinople, Egypt came a Turkish pashalik. The Mamelukes still retained a large share power down to 1798, when Napoleon I. stormed Alexandria and over-ew them at the battle of the Pyramids. The defeat of the French fleet Aboukir by Nelson obliged the French to evacuate Egypt in 1801, hammed Ali, the founder of the present reigning house, being appointed sha of Egypt in 1811. Though still remaining nominally under Turkish e, Egypt then became practically independent, except for the payment an annual tribute, and the necessity of each succeeding ruler receiving rman of appointment from the Sultan. In 1866 the Porte raised Ismail sha to the rank of Khedive, or viceroy, which became hereditary. ring the reigns of Said and Ismail, French influence was predominant, d in 1869 the construction of the Suez Canal was successfully accom-shed by M. Ferdinand de Lesseps. Owing to the maladministration of nail, the public debt increased enormously, and in 1879 the European wers called upon Turkey to depose the viceroy. In 1882 as the result of revolt against European control, and upon France declining to join the ited Kingdom in an armed demonstration, the British fleet bombarded xandria and the British army occupied Egypt. Some of the effects of occupation have been the reorganisation of the Egyptian army, finances, d judiciary, the abolition of compulsory labour, or the corvée, and the rrying out of a more perfect system of irrigation, which had already been rtly planned by French engineers. Meanwhile, a rebellion had com-nced in the Sudan (which had only been conquered under Mohammed Ali d his successors), led by a chief who had taken the title of Mahdi, or phet. After several unsuccessful expeditions had attempted to quell the volt, Khartum was captured by the Mahdists in 1885, on the eve of being ieved by a British force, and the Sudan was abandoned for ten years. 1898, after two years of slow but steady advance southward, Lord tchener at last crushed the forces of the Khalifa (the Mahdi's successor) the capture of Omdurman, opposite Khartum. The Khalifa was finally feated and slain by Sir R. Wingate in 1899.

People.—It appears probable that the first civilised Egyptian invaders re of Caucasian origin, and came from an original home in Asia, but the peoples previously inhabiting the country no records have at esent been found. The Fellahin, or peasant dwellers on the Nile, are

probably direct descendants of those who were the cultivators in ea days. The reason of their conservatism as regards habits and made life is to be sought in the uniformity of the conditions by which they we surrounded, depending on the regularity of the seasons determined by t rise and fall of the river. They are of medium height and of somewh heavy build, with high cheek-bones, receding forehead, and thick lips, a in colour varying from light to dark brown, according to the latitude. belief the fellah is a Mohammedan, but his religion is tinged with remna of the older Egyptian worship, many of the ceremonies still savouri rather of the cult of Isis than of the creed of Islam. They number abo 2,000,000.

The Copts, who are the remnants of the dominant Egyptian race, a chiefly resident in the large towns, where they are watchmakers a goldsmiths, and are very often possessed of considerable wealth. Th are usually easily distinguished, as they wear a black turban, and build are somewhat below middle height, with small hands and feet, a comparatively fair complexions. The Copts in religion are professe Christian, having many of their rites identical with those of the Gre Church. They have preserved their faith in spite of the many centuri of Moslem domination, still possessing a number of large churches a many schools. They number at the present time 800,000 souls, and t teaching of the Coptic language, a modified dialect of the ancient Egyptia is now compulsory in the schools supported by this community.

In the desert wander the nomadic Arab tribes generally classed togeth under the name of Bedouin or Bedawin, the principal of these being t Towarah, in Sinai; the Maazeh, in the northern part of the Arabian des down to lat. 27° N.; the Ababdeh, south of the Kena-Kosseir line; t Bisharin, in the deserts of Assuan; and the Hadendoa, in the direction Suakin. Still further south are wild tribes including the Baggara, t backbone of the Khalifa's army, while the Aulad 'Ali Bedawin inhab the western desert. All these tribes are nomadic, wandering from pla to place, and pitching their tents wherever food and water supply a favourable. The free life gives them independence of character, and pride which poverty cannot erase. The western Bedawin and the Maaz are often strict Mohammedans, and the southern tribes were famous f their fanatical support of the Mahdi, but the others are very little affect by their nominal religious beliefs, and the Towarah scarcely know anythi of Mohammed, Moses being their chief prophet. The typical Bedawin of slender build, with thin neck and limbs, and of a dark brown co plexion.

The Arabs of the towns are a somewhat indolent race, contact wi Turks and Europeans having caused them to lose the finer characteristics their desert neighbours, though they are often of ready wit, and amiab in disposition. The great majority have delicate features, the complexio being often whiter than those of the average European. Arabic is t

ommon language in all the region north of Khartum, replacing Coptic fter the conquest of Egypt by 'Amr in 640 A.D.

A great part of the Sudan is occupied by about twenty different negro aces of too varied a character to permit of further description here.

Government.—The government of Egypt is under the control of ative Ministers, themselves subject to the Khedive, here being in addition a British financial adviser, ithout whose permission no financial decision an be arrived at, but he is not an executive officer. n addition, there is a Legislative Council of thirty iembers, fifteen residing in Cairo and fifteen oming from the provinces, to whom all general ws are submitted for examination; while a eneral Assembly has to be summoned every two ears, without the consent of which no direct personal or land tax can e imposed. In addition the British Consul-General has large powers f an undefined character.

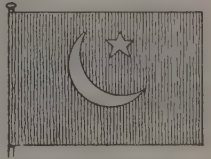

FIG. 443.—*The Egyptian Flag.*

Internal Communications.—The Nile is the chief medium of communication from the Sudan to Alexandria, while in the Delta a system of anals radiate in every direction. Railways, too, now run from Alexandria, ort Said, and Suez to Cairo, whence another line follows the Nile valley outhward, and was opened to Khartum in 1899. Communications with the esert regions and shores of the Red Sea are only maintained by means of amel caravans or steamers from Suez.

Political Divisions and Towns.—Egypt is divided into Governorships and Mudiriehs, there being twelve of these in Lower Egypt, nine in pper Egypt and one for the Oases. The Mudirs have wide powers over nternal administrations, each town and village having in addition a Sheikh-el-beled, or mayor, who is responsible to the Mudir. The two provinces nto which Egypt, north of the Sudan, is divided are of unequal size, Lower gypt being the smaller, but containing the Delta and Cairo, while Upper gypt mainly consists of desert country and the long Nile valley.

The principal town is *Cairo*, the largest city in Africa, occupying the ommanding position at the junction of the valley of the Nile and the elta. It has the Khedive's palace, the usual government buildings, old osques, picturesque streets, and a great museum of Egyptian antiquities. n account of its good European hotels and its dry climate it has become great winter resort for wealthy Europeans and the centre for the tourist affic on the Nile. *Alexandria*, the principal port of Egypt, is a purely ommercial town trading with Europe; *Tantah*, occupies an important entral point in the Delta itself; *Port Said* and *Suez* derive their importnce from being at the northern and southern terminations of the Suez anal. *Assiut*, *Naghamadi Kina*, *Assuan*, *Wadi Halfa*, *Dongola*, and *Berber* re the principal towns on the Nile itself, while *Khartum* at the junction f the two Niles, was, and will again become the centre of Egyptian trade

with the Sudan. A college in memory of General Gordon has been establish there as a centre of education for the natives. The Sudan has been organised under joint British and Egypti control, with a military governor entrust with very large powers.

FIG. 444.—*The Provinces of the Reorganised Sudan.*

The Suez Canal.—This great wat way connecting the Mediterranean and t Red Seas, has become the main channel communication between Europe and t East (Fig. 442). From Port Said to Sue has a length of 87 miles with surface bread of from 65 to 120 yards, and a depth 26 feet, and runs for 21 miles through t Great Bitter Lake and Lake Timsah. Unc a special convention it has been neutralis by the Powers and is managed by an int national commission. On the average vessels pass through the canal every day, and seven out of every are under the British flag. The value of the canal is mainly felt on routes to India, China and Australia; steamers trading to New Zeala find it as economical to spend a few more days on their voyage out by Cape of Good Hope and home by Cape Horn as to pay the heavy canal du

The Libyan Desert.—Beyond the narrow fertile belt nourished the Nile, in which the population of Egypt is concentrated, and on wh the importance of the country depends, there are vast deserts on eit side, many parts of which are unexplored. The Libyan desert, on west, is an immense stony plateau from 600 to 1,000 feet above the N level, and rising in a series of gentle steps towards the interior, a few isola sandhills or low cliffs being the only elevations in the apparently horizon expanse. A series of deep depressions, sharply defined by the precipit walls of the plateau, occurs in this desert more than 100 miles from Nile, constituting the celebrated oases, named, beginning with the south —Khargeh, Dakhel, Farafah, and Baharich. The last named is connec by a number of minor uncultivated depressions containing salt lakes, w Siva, the ancient oasis of Jupiter Ammon, which lies over 300 miles w of Cairo, and is inhabited by the fanatical Senussi Arabs. South of Kharg this line of depression approaches the valley of the Nile. Owing to existence of numerous springs in these districts certain portions are tremely fertile, and during many centuries have been centres of populat and cultivation. To the west of them extend the unexplored wastes of Sahara, whose wind-blown sands are piled up into shifting dunes of from 300 to 400 feet in height.

The Arabian Desert.—The Arabian or eastern desert is of a v different character. To the south of the latitude of Assuan it forms a m of mountains and hills which have been but little explored, while sa

ıstes are replaced by wadis covered with the angular *débris* derived ɔm the surrounding elevations. To the north of 27° N. the arrangement of lley and mountain is more regular, the waterless, steep-sided limestone ıteau (which extends in places for over 50 miles east of the Nile) being parated from the Central Red Sea Chain by the broad Wadi Kena, which ns north-west for about a degree of latitude, the mountains also trending the same direction. Lesser hill and valley systems run more or less rallel to each other, to the main range, and to the Red Sea. The flat nestone plateau is about 1,200 feet above Nile level, while the Red Sea lls, which are characterised by the extreme ruggedness of their outline, e over 6,000 feet high in the Ghattar and Um Delpha (Es Shayib) ıssifs. At the northern end of the chain, Jebel Gharib nearly attains the ne elevation. North of 28° 45′ N. the limestone plateau occupies the ıole region, giving rise to the desolate, steep-sided hills of Gallala, while est of Suez and Ismailia the country consists of broken ridges, arid nd and pebble desert. This inhospitable region is traversed in 29° N. the wide Wadi Arabah, which runs east and west from the plateau to e Red Sea.

The Peninsula of Sinai.—This peninsula, which is the sixth divi-n, is closely connected with the Arabian desert system, and consists of central mountain mass separated from the Red Sea by the plain of Gaah, and small ranges parallel to the same sea. On the north, sandy ains and lower sandstone ranges intervene between the main chain and e desolate plateaux of the Desert of the Wanderings, while on the east ns the deep Gulf of Akabah, which forms part of the great rift valley tending from the Sea of Galilee to Lakes Tanganyika and Nyasa.

STATISTICS.

	1882.	1897.
Area of Egypt (excluding Nubia and Deserts)	10,340	10,340
Population of Egypt " "	6,575,958	9,494,023[1]
Density of population	636	918
Population of Cairo	368,108	570,062
" Alexandria	208,755	319,766
" Tantah	33,725	57,298
" Port Said	16,560	42,095
" Assiut	—	42,012

ANNUAL TRADE (*in pounds sterling*).

	1881–85.	1891–95.
Imports	8,000,000	9,000,000
Exports	12,200,000	12,700,000

TRADE THROUGH SUEZ CANAL.

Year.	No. of vessels.	British vessels.	Total tonnage.	British tonnage.
1888	3,440	2,625	8,183,313	7,335,062
1896	3,409	2,162	12,039,859	8,057,706

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[1] Population of Nubia by Census of 1897 = 240,382.

CHAPTER L.—EAST AFRICA

I.—EASTERN EQUATORIAL AFRICA

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Professor of Geology in the University of Glasgow.

Position.—Abyssinia, Eritrea, Somaliland, and British East Afri with the off-lying islands from Sokotra to Zanzibar, may be co veniently grouped together as Eastern Eq torial Africa. This section of the contin is bounded to the east by the Red Sea a Indian Ocean, to the west by the watersh separating the Congo and Lake Chad fr the Nile, to the north by the deserts Kordofan and southern Nubia, and to t south by the frontier of German East Afri

FIG. 445.—*The East African Rift-Valleys.*

Configuration and Geology.—T general configuration of this area is simp The region is part of an ancient plate which once extended across tropical Afri and was probably continuous with the p insular area of India. The height of t country has been increased in places broad sheets of volcanic rocks, which sometimes piled up into lofty peaks a craters; in other places the level has be lowered by the sinking of belts or bro areas of land, as along the coastal plain, t basin of the Victoria Nyanza, and the N and Eritrean rift-valleys.

The arrangement of the river syste has been mainly determined by the lines subsidence. The most important river is t Nile, of which the Victoria Nyanza is t principal source; this lake discharges nor ward by the Somerset Nile, which ent the northern end of the Albert Nyan There the main Nile is increased by t rainfall on both flanks of Ruwenzori and by the surplus waters of t Albert and Albert Edward Nyanzas. Leaving the former lake the N

ows northward, and after a course of 500 miles is joined by the Bahr-el-hazal, which drains the region north of the Congo basin and east of that Lake Chad. On the east bank the chief tributaries are the Sobat, the lue Nile and the Atbara, which drain the highlands of Abyssinia. East the Nile is a zone of internal drainage along the Eritrean rift-valley. ie chief rivers of this system are the Hawash and Omo of southern byssinia; the Turquell and Kerio, which flow into the southern half of ake Rudolf, and the Murendat, which enters Lake Naivasha. The third t of rivers flow eastward into the Indian Ocean, the most important are e Webi Shebeyli, the Jub, Tana and Sabaki.

The lake system is one of the most striking geographical features of the gion. The lakes are of two types, broad round lakes in depressions on e plateaux such as the Victoria Nyanza and Lake Tsana, and long narrow kes in the two rift-valleys. In the western rift-valley occur Tanganyika, e Albert and Albert Edward Nyanzas; in the eastern or Eritrean rift-lley are Lakes Dembea, Abbaya, Stefanie, Rudolf, Baringo, Losuguta, metaita, Naivasha, and the dried up Lake Suess.

The mountains belong to four groups—(1) ridges and blocks of old rchæan rocks, either left standing above the general level owing to the perior hardness of certain bands, *e.g.*, the Taita Mountains, or raised by ustal movements as in the high snow-clad ridge of Ruwenzori; (2) lines volcanic craters, *e.g.*, the Kyulu Mountains of Ukamba; (3) isolated lcanic peaks, *e.g.*, Kenya (17,000 feet), Ruwenzori (18,000), and Elgon 4,000); (4) the scarps of fault lines such as the Mau and Kikuyu scarps the Eritrean rift-valley, the Laikipia scarp, east of Baringo, or the stern face of the Abyssinian plateau.

Geologically, Eastern Equatorial Africa consists of a plateau of Archæan cks (gneiss, schists, amphibolites, &c.). On the eastern flanks of the ateau are some fossiliferous rocks; some Permo-Carboniferous shales cur in the Sabaki valley, and some obscure older fossils have been found ar Mombasa, and a belt of Jurassic rocks may be traced from German ast Africa along the coast and up the Jub to Abyssinia, where some etaceous rocks have also been found. Later, volcanic action began by the uption of some lavas (monchiquites) on the coast, vast sheets of volcanic aterial were spread over the plateau from the Athi plains to the uplands Abyssinia. Volcanic action continued for a prolonged period; some of e craters, such as Longonot near Naivasha, are quite recent, and some are id to be still in eruption. Fumaroles and hot springs are common in the stricts where volcanic fires lingered longest.

Climate.—The region lies wholly within the tropics and is traversed the equator, but the heat is not as a rule excessive. On the coastal plain d at Zanzibar the air is very moist, and the daily variations in tempera-re are slight. On the plateaux, and especially on the bare, sandy plains, e Sun's heat is very powerful in the day, while the nights are often cold. ne rain falls at two seasons, the "big rains" of the spring and the "small

rains" of the autumn. The amount, however, is very uncertain. On
sandy plains of the Nyika the rainfall is small. It is heaviest on the h
forest belts, where, moreover, the separation into wet and dry seasons is
definite. Frosts are not uncommon above the height of 6,000 feet; sn
falls on the higher mountains of Abyssinia and Elgon, and is permanent
Ruwenzori and Kenya. The latter has a system of small glaciers.

Flora and Fauna.—The character of the flora varies largely w
the altitude. On the coastal plains and islands there are palm-gro
fruit orchards, spice plantations, and common members of the Indian fl
On the sandy plains there is a scanty growth of acacia, thorn scrub, s
tered tufts of dry grass, and trees with succulent stems like the candelab
shaped euphorbias and the fibre-yielding Sanseviera and aloe. Distr
that are better watered and have richer soil are covered with woo
flowering shrubs. On the plateau there are belts of forest with m
coniferous trees, and above these is a zone of bamboo jungle reaching
to the level of over 9,000 feet. Still higher are alpine meadows with pla
belonging to Mediterranean genera; many of these northern plants, s
as the groundsel, lobelia, and heath, which in Europe grow as small
herbs, are represented on the East African mountains by tall woody tre

The most conspicuous features in the animal life of the region are
big mammals, such as the elephant, rhinoceros, hippopotamus and gira
antelope are numerous, but there are no deer. Crocodiles, pythons, cob
and puff adders are the most important reptiles. Vast flocks of p
flamingoes on the salt lakes, and of pelicans on the borders of the low-l
lakes and swamps, weaver birds on the river banks, and sun-birds on
high mountain meadows of Kenya and Ruwenzori, are the most c
spicuous of the birds.

Natural Resources and Trade.—In East Africa trade as ye
unimportant. The soil, especially on the volcanic regions and alluvial ri
plains, is very fertile—when well watered. The lowlands near the co
and the islands of Zanzibar and Pemba grow spices and the usual trop
products. The sandy plains support abundant fibre-producing plants.
vines and lianas that hang over the trees of the lowland forest belts sec
india-rubber. Herds of cattle live on the plains, but they are periodic
decimated by rinderpest, and their distribution is restricted by the tsetse
Useful timber is scarce, but it would grow in many districts that have b
deforested by man and prairie fires. The mineral wealth has not yet b
prospected. Iron ore is universally distributed, and is often of g
quality, but it is commercially useless owing to scarcity of fuel. C
occurs in Abyssinia, some silver and lead near Mombasa; but there is
proof that they are abundant, and the general conditions do not sugg
more than occasional patches of valuable ores. In the absence of min
wealth, the economic value of the country appears slight owing to
thinness of the population, irregularity of rainfall and difficulty of inte
communications. At present the only valuable product of the interior is iv

ie main exports are ivory, rubber, copra, hides, cloves and gums. The incipal imports are cotton cloths, iron and brass wire, beads, and, where t excluded by the enforcement of the Berlin Act, guns and ammunition. There are no manufactures; some of the inland tribes can work iron, ocured either as iron-wire from trading caravans, or by collecting grains iron oxide from the streams; most of the people can tan leather, and some bes such as the Waganda prepare a kind of cloth of bark. On the coast ids grass mats and baskets are woven. The arts and agricultural methods e extremely primitive.

The usual native method of internal communication is by caravans of rters carrying loads on their heads (the Zanzibari), or on sticks resting their shoulders (Abyssinians). Donkeys are available in some districts, ules in Abyssinia, and camels in Somaliland. Dug-out canoes are used by e Pokomo on the Tana, and by the Shilluk on the Sobat and the Nile; t with the exception of the Nile the rivers are of little use as waterways.

The Native Peoples.—The natives belong to five chief groups. ie main basis of the population in the southern part of the region is gro, of the Bantu division. Members of this race occupy the islands of nzibar and Pemba, and range along the coast as far north as the Jub; ey extend westward as far as the eastern rift-valley, with occasional tliers beyond. The principal Bantu tribes are the Wakamba, Pokomo, ataita, Wanyika. The members of these tribes are copper-coloured, ve curly hair, thick lips, projecting chins and broad noses. These bes are included with most of those of southern Africa in the Bantu oup owing to the general grammatical resemblance of their languages, iich are characterised by the inflexion of the first syllable, and by the e of sentences which consist of several words fused into one. The most portant of the Bantu languages is Suahili, which serves as the *lingua anca* of Eastern Equatorial Africa. The Suahili occupy the coast-lands d islands between the Jub river and Zanzibar. The race is very mixed d has been formed by the intermarriage of Arab traders with the natives various Bantu tribes. Similar mixed races occur on the northern and estern margins of the Bantu area. Thus the Waganda are Bantu improved an infusion of Hamitic blood, due to the conquest of Uganda by a band Wahuma warriors. The Kikuyu are probably a similar mixture of ntu and Nilotic races, and are therefore to be included among the egroid tribes. The Nile basin is the home of another race-group, the ilotic; the Bari of the Upper Nile is the most representative tribe of is group, of which another, the Masai, has forced its way along the ritrean rift-valley as far south as German East Africa. Abyssinia is habited by a great mixture of races, Semitic, Hamitic, and Negroid. At ie time the dominant tribe was Semitic, but at present the Hamitic ioans hold the reins of power. Somaliland is occupied by Hamites, hose ancestors crossed from Arabia; to the south of the Somali are the mnants of the nearly allied and once powerful tribe, the Galla. The

last group represented in Eastern Equatorial Africa are the dwarf pygmies, probably the survivals of a once widely scattered race, almost extinct. Typical "Negrillo" dwarfs, similar to the "Akka the Welle, occur on Ruwenzori, while hybrid tribes, such as the Dol Laikipia and Shoa, live in the forests of the eastern plateaux.

ABYSSINIA

Configuration.—Abyssinia (or Ethiopia) consists geographically o rugged plateau country, mostly 8,000 feet above sea-level, which surro the head streams of the Atbara and Blue Nile. It is bounded to north by the deserts of southern Nubia, to the east and south-east by western wall of the Eritrean rift-valley, to the west by the Atbara the lowlands of the Nile basin, and to the south by the angle betweer Omo and the head streams of the Sobat. Politically the country is extensive, especially to the south-east, as since 1887 the Abyssinians held Harrar, and a large tract to the east of the Eritrean rift-valley; to south Abyssinia claims districts which are also claimed as within British sphere. Ethnographically Abyssinia is a confederation of different and often hostile tribes; the name of the people Abeshi Mixed, refers to this fact.

The configuration of Abyssinia, in the geographical sense, is sim the country consists of a block of Archæan gneiss and schists, which been intensely eroded by subaërial agencies; it has been capped by shee lava, and is flanked by Jurassic limestones; in places huge piles of volc *débris* form mountains reaching the height of from 15,000 to 16 feet in Semien. In the centre of the country is a great depres occupied by Lake Tsana (1,200 square miles in area), which is the princ source of the Blue Nile.

People and History.—Unlike the other political divisions of Africa, Abyssinia has a history, which dates back to a very remote per The country is probably the Cush of the Scriptures, and according local belief it was the home of the Queen of Sheba. The "emper claims his descent from Menelik, the son of Solomon by the Queer Sheba; and one tribe, the Falashas, claim, though erroneously, to be Jewish origin. The country was early converted to Christianity by Coptic Church; the language of the Abyssinian church is the oldest kno form of Himyaritic, and was once spoken in the province of Tigré.

Muhammed Granye, of Harrar, invaded Abyssinia from 1528 to 154 order to convert the country to Mohammedanism, in which he nearly s ceeded. Efforts to convert the people to the Roman Catholic Church le the exploration of the country by Portuguese Jesuits in the 16th and 1 centuries. The Tigrians were then the dominant race, but when Br travelled through Abyssinia at the end of the 18th century, the Amhar held supreme power. The country was invaded in 1867 by a Brit expedition sent to punish King Theodore of Amhara. His succes

hn, was killed by the Mahdists in 1889, and on his death, by the aid of e Italians, Menelik of Shoa seized the sovereign position of Negus gusti, or King of Kings. In 1889 the Italians proclaimed a protector- over the whole of Abyssinia; but in 1896, after the destruction of an lian army by Menelik at Adowa, this claim was withdrawn, and Italy nfined to the lowlands of Eritrea.

Trade and Towns.—The chief commercial products are gold and ffee, but the trade of the country is at present unimportant.

The present capital is *Addis Halem*, but the position is periodically anged when the supply of firewood is exhausted. Of the old towns the ost important are *Gondar*, the capital of Amhara, *Adowa*, the chief town Tigré, *Aksum*, the former ecclesiastical centre, and *Harrar*, an important ade centre near the Somali frontier.

ERITREA

Eritrea, or Erythræa, a term derived from the classical name of e Red Sea, is the Italian protectorate at the south-western end of the d Sea. It is a triangular tract of lowland which extends along the Red a from Ras Kasar (18° N.) to the frontier of the French Somali Coast 2° N.), and stretches westward to the scarp of the Abyssinian plateau. ost of Eritrea is a barren, sandy plain, which in places sinks below a-level. The best harbour and only important town is *Massowa*, situated a small coral island connected with the mainland by a causeway. From assowa two short railways run westward across the coast plain to the ot of the Abyssinian hills. The only important natural products are salt, rived from a number of dried lakes and lagoons, and pearls which are hed on the Dhalac Islands near Massowa. Salt is valuable as the prin- al currency of southern Abyssinia.

Eritrea is mainly inhabited by Hamitic races, of which the most portant tribe is the Danakil. Italian political connection with Eritrea gan in 1880, when Assab was transferred from a trading company to the lian Government. Massowa was occupied in 1885 on the withdrawal the Egyptian garrison. By subsequent treaties the whole of Eritrea as annexed and a protectorate proclaimed over Abyssinia. But after the lian defeat at Adowa the independence of Abyssinia was recognised, d the Italian sphere limited to the arid coast plains. Except as a trade ute to Abyssinia, Kassala and the Atbara region of the Sudan, the untry is of little value, and most of the Abyssinian trade is now being nsferred to the French port of Jibuti.

FRENCH SOMALI COAST[1]

French Somaliland.—The old harbour of Obok, opposite Aden, at e entrance of the Red Sea, has been superseded since 1896 by *Jibuti* in better situation on the south side of the Bay of Tajura. These coast

[1] By M. Zimmermann.

stations have been augmented by a hinterland which forms the Protecto of the Somali Coast. It acquires considerable importance, not only f its position, but from its proximity to Harrar, in Abyssinia, and from railway which has been commenced from Jibuti to Addis Abeba, capital of that country.

SOMALILAND

Somaliland.—The "Eastern Horn of Africa," which projects into Indian Ocean on the south side of the Gulf of Aden, is occupied by Somali tribes, and is accordingly known as Somaliland. The cou faces the north with a steep scarp running east and west from C Guardafui to near Harrar. East of Berbera the scarp is separated f the shore by a narrow belt of coastal plain and a few foot-hills. But w of Berbera the coastal plain widens owing to the northward advance of coast. At the summit of the scarp a broad plateau slopes gently to south; on its northern border is a belt of waterless desert, the Haud. southern slope leads down to the Webi Shebeyli, separated from which a scrub-covered plain is the River Jub, which divides Somaliland f British East Africa.

The natives are mainly Somali, a Hamitic race of Mohammed They are a pastoral, nomadic people, and have herds of camels, ca sheep, and horses. Along the Webi Shebeyli are some Bantu tribe Negroes, while some Galla remain along the southern and western front

The northern coast as far as 49° E. is a British protectorate under Foreign Office. The British sphere extends inland to the 8th para of N. lat. The rest of the country was an Italian protectorate; but s 1896 Abyssinia claims a large share of Somaliland. By the treaty of A Abeba in 1896 the Italian sphere was limited to a strip 180 miles w along the coast; by a treaty with the United Kingdom in 1897, s 8,000 square miles of British Somaliland were ceded to the Abyssini who now possess all except the two coast protectorates.

The principal towns in British Somaliland are *Berbera*, opposite Ad *Bulhar*, and *Zaila*, of which the last is an important starting-place caravans for southern Abyssinia. Along the Italian or Benadir coas Somaliland the chief towns are *Mogadishu*, *Barawa* and *Merka*. The Ita administration has its seat at the new settlement of *Itala*, about 100 m north-east of Mogadishu.

The principal exports from Somaliland are ivory, gums, hides and spi

SOKOTRA

Sokotra is geographically and geologically a dependency of Som land, from the eastern promontory of which it is 150 miles distant. So smaller islands, the Brothers, help to link Sokotra to the mainland.

The island of Sokotra has an area of about 1,500 square miles, wi population of probably about 10,000. Most of the island is a plateau ab

feet high, but it is traversed by a mountain ridge of which the peaks to a height of over 4,000 feet. The natives are mainly descendants of migrants from southern Arabia and of fugitive Negro slaves. The ves were once converted to Christianity by Portuguese missionaries, have returned to Mohammedanism. Since 1886 the island has been a tish possession. The capital is *Tamarida*, a village on the north coast. e trade is insignificant.

BRITISH EAST AFRICA

Surface.—British East Africa is the largest of the political divisions Eastern Equatorial Africa. It extends from the coast of the Indian an to the Congo Free State, and from German East Africa to an delimited frontier on the north. Its general configuration is com- atively simple. It may be regarded as consisting of a series of zones, roximately parallel to the coast. First is the low coastal plain, fringed h islands formed by beds of coral lime- ne or of alluvial deposits, separated from mainland by a series of branching creeks backwaters. The coastal plain is narrow posite Mombasa, but in the valleys of the aki and Tana it is of considerable width. m the coastal plain a steep slope leads to the inland plateau, a broad tract of ulating barren country known as the ka; it is covered with acacia scrub, has turf, and is in the main waterless. West of the Nyika extend the grassy ns of the volcanic region. The Eastern or Eritrean rift-valley cuts oss this from south to north, lowering a belt of country now occupied a series of lakes and rivers without outlets to the sea. Beyond the tern wall of the Eritrean rift-valley there is a gradual slope downward he Victoria Nyanza basin and the valley of the Nile.

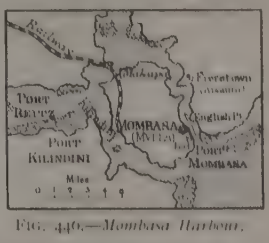

FIG. 440.—*Mombasa Harbour.*

People and History.—The coast lands and off lying islands of tish East Africa were once occupied by independent Bantu tribes. b, Baluchi, and Hindu traders settled along the coast at different nts at an early period, and they held their stations without foreign inter- nce until the arrival of the Portuguese at the end of the fifteenth tury. The Portuguese erected forts at Mombasa, Melindi and Lamu held the country as an intermediate station on the way to India. h the downfall of the Portuguese empire in India the East African onies became less important, and the coast north of Moçambique again under the Arabs, who had maintained throughout their rule in zibar. British intervention began in 1824 by the temporary annexation Mombasa, an act, however, repudiated by the home government. In 9 the Sultan of Zanzibar offered the United Kingdom a protectorate r his dominions, which was declined. Germany in 1884 acquired a

foothold on the coast opposite Zanzibar, and a protectorate over Wi and near the Tana delta, in 1885. The United Kingdom, in reply, occu Mombasa, and accepted administrative rights over the Sultan of Zanzi territory on the mainland, which was entrusted charter to the British East Africa Company in This company sent numerous exploring expedi through the country, established stations, and occu Uganda. Exhausted by these expensive effor handed over the administration of the country to Crown in 1895, and since that time it has been by the Foreign Office. The trade as yet is sm the imports in 1901–2 amounted to £421,000, m piece-goods and food supplies.

FIG. 447.—*The Badge of British East Africa.*

The country now forms two divisions, the East Africa Protecto which extends from the coast to the north-west shores of the Vic Nyanza, and the Uganda Protectorate which extends westward to western lakes and the Nile.

The **British East Africa Protectorate** is divided into seven vinces: the Coast Province, Ukamba, Tanaland, Jubaland, Ke Naivasha, and Kisumu. Jubaland is imperfectly explored and boundaries indefinite; but the main features of most of the are known.

The **Uganda Protectorate** includes Uganda proper, which li the north-western corner of the Victoria Nyanza, and the adjacent c tries of Unyoro, Usoga, part of Kavirondo, Koki and Ankole. The south south-western, and south-eastern boundaries are defined, but to the n the limits are still indefinite on the side of the Anglo-Egyptian Su which includes the Bahr-el-Ghazal and all the lowlands between Abyssinian highlands and the Nile. Uganda is a small country a population estimated at about 300,000, which has probably dimini during the past twenty years. The country is not very healthy, bu strategic importance is great. A band of Wahuma invaded the cou from the north-east, settled and intermarried with the original B people. As a result of this mixture of races the Waganda are of unu intelligence. The country was first visited by Speke and Grant in and by Sir Samuel Baker in 1864. Stanley reached Uganda in 1875–6, called attention to its political importance. It was taken under the tection of the British East Africa Company in 1889; after a severe stru the British supremacy was maintained by Lugard in 1892, and in 189 country was taken over by the British Government. A railway, compl in 1902, now connects the Victoria Nyanza with the coast at Momb and this makes it possible to test the economic value of Uganda; cost of transport by caravans of porters being £300 a ton no develop was formerly possible.

The Protectorate has been divided into the Central, Uganda, West Nile, and Rudolf provinces. The native capital of Uganda is *Mengo*, and

British headquarters at *Entebbe*, on a point running into the lake. There is little game in the country, and the main food of the natives is the banana.

ZANZIBAR AND PEMBA

Zanzibar Island lies thirty miles off the coast of German East Africa in lat. 6° S. It consists of layers of sand and clay associated with banks of coral limestone; most of it is low-lying, but in the north some hills rise to the height of about 1,000 feet. The soil is fertile, and nearly the whole island is cultivated; cloves and coco-nuts are the two chief products. The population is dense. The natives are extremely mixed in race, members of all the East African tribes having been imported as slaves; they have intermarried among themselves and with Arabs, Persians and Baluchi traders. A few of the original Bantu inhabitants are represented by some settlements of Wahadimu in the north of the island. The name *Zanzibar*, which means "the land of the black," is also given to the chief town, which is situated on the south side of a bay on the west coast, and is the principal commercial centre in Equatorial Africa. Its imports in 1901 were worth £1,196,000, and its exports £1,168,000.

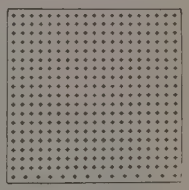

FIG. 448.—*Average population of a square mile of Zanzibar.*

The importance of Zanzibar has arisen from its early adoption by the Arabs as the capital of their East African settlements. The Sultanate was long subject to the Imans of Muscat, but it became independent in 1856. Until 1884 the Sultan was the acknowledged ruler of the East African coast lands from Moçambique to Somaliland. In 1884 the southern part of his mainland territory was acquired from him by Germany. In 1890 a British protectorate was formally proclaimed over the remainder. The Benadir coast, *i.e.*, the eastern coast of Somaliland, was, however, transferred to the protection of Italy. At present the Sultan of Zanzibar theoretically rules the coast belt of British East Africa, but practically this is administered from Mombasa, and is treated as an essential part of the British sphere.

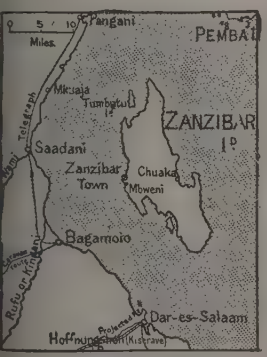

FIG. 449.—*Zanzibar and mainland ports.*

Pemba.—The adjacent island of Pemba is 40 miles north of Zanzibar, and is under the jurisdiction of the Sultan. It is 40 miles in length, running parallel with the coast of the mainland, at a distance of 60 miles, from Pangani to Tanga. The soil is fertile, and the population consists mainly of

slaves and freed slaves engaged in the clove and coco-nut plantations. The basis of the island appears to consist of lines of raised coral reef. The chief town is *Chaki-Chaki*, situated on the east coast. The language of the aboriginal inhabitants, or Wapemba, is a dialect of Suahili.

STATISTICS

(*Estimates.*)

	Area in sq. miles.	Population.	Density of Population per sq. mile.
Abyssinia (excluding Somali territories)	309,000	5,000,000	17
Eritrea	88,000	400,000	4
French Somali Coast	8,600	30,000	3
Somaliland, British	68,000		
" Italian	136,000	2,000,000	7
" Claimed by Abyssinia	100,000		
Sokotra	1,500	10,000	7
British East Africa	350,000	5,000,000	14
Zanzibar	625	200,000	320
Pemba	360	90,000	250

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II.—GERMAN EAST AFRICA

By Graf von Pfeil.

Surface and Configuration.—The coast of German East Africa (*Deutsch Ost-Afrika*), about 620 miles long, shows little morphological development, but is not destitute of excellent harbours, Tanga, Kilwa, Kisiwani, Lindi, Mikindani, and the best and principal harbour, Dar-es-Salaam, deserve special mention. They all owe their origin to small rivers whose discharge of fresh water caused a break in the growth of the coral which built up this coast. Three islands of fair size, Pemba, Zanzibar, and Mafia, show by the rocks of which they are composed that they once formed part of that zone of coral limestone which, together with clay schists and sedimentary deposits, forms a coastal plain of about 10 to 30 miles in width. South of the Rufiji, this plain, gradually rising, extends towards the mountains on the eastern side of Lake Nyasa. West of the coast-land the high plateau is composed of ancient rocks, gneiss and mica-schists; near the northern end of Lake Nyasa Carboniferous sandstone runs in a southerly direction towards the Rovuma river, near which coal seams have been discovered. Igneous rocks, basalt, trachyte, andesite, occur in the northern part of the protectorate between Kiliman-

aro and the Victoria Nyanza. The great Unyamwezi plateau is simply composed of granite. In some spots lacustrine deposits are found. In a vertical sense East Africa shows comparatively little development. Along its western border extends the continuation of the great western rift-valley. The vast territory situated between it and the Indian Ocean may be broadly characterised as a tableland. To understand its configuration we might picture to ourselves that it was suddenly rent open in a direction nearly parallel to the coast. The cleft thus supposed to be produced is called the Eritrean rift-valley, and it divides the plateau into two parts, each of which has been considerably disturbed from its original level. The western portion retained its old height in the north, while the western side and southern end subsided; the eastern, and much narrower part of the plateau, retained its elevation along its western border, while the eastern side and southern end were probably tilted up. By whatever Earth movements the present configuration of the country was brought about, the result is to give the country its greatest elevation in the region north of Lake Nyasa, where an altitude of about 9,000 feet is attained by the highest peak. The average level of the plateau lies between 3,000 and 4,000 feet. The sides of the rift-valley are precipitous, so is the drop of the tableland on the east side where it presents the appearance of a tall mountain range when seen from the low coastal plain. Where the Eritrean rift-valley crosses the northern boundary of German territory the volcanic forces, which opened all the rents radiating from this spot, seem to have had their seat. From a rift which branches off in an easterly direction, Mount Kilimanjaro rises, towering to an altitude of 19,200 feet. From its extinct crater an immense glacier descends, from which the Pangani river derives its chief water supply. A longer rift called the Wemberre, extends in an opposite direction; its northern portion is occupied by a shallow lake, and several smaller lakes are situated in the neighbouring main rift. South-east of Kilimanjaro the mountains of Pare and Usambara rise abruptly from the plains, a narrow strip of which separates them. They approach much nearer the coast than any other mountainous part of East Africa, and they are but loosely connected through the mountains of Nguru with the central Plateau. The Pare and Usambara mountains are covered with tall primeval forest. A similar isolated group of mountains rises in the more southern district of Ukami.

Hydrography.—The country east of the great fissure sends its drainage to the Indian Ocean. The Pangani is the channel through which Kilimanjaro and the Pare and Usambara mountains discharge the rainfall which they receive partly from the south-east monsoon. The Wami rises in the mountainous plateau border, while the Kingani, rising in the Ukami mountains, belongs entirely to the littoral region. Only the Rufiji-Ruaha has its origin on the plateau, its great tributaries, the Ulanga and the Rovuma, have their sources at the foot of the mountains east of Lake Nyasa. The Pangani is navigable for about 12 to 18 miles the Rufiji for

more than 60 miles in its lower course, and its tributary, the Ulanga, f a considerably longer distance. The plateau west of the fissure, muc drier than its eastern portion, sends its water through the Malagara river to Lake Tanganyika, and thence to the Atlantic. The northe portion of German East Africa, sending amongst other and smaller rive the Kagera to the Victoria Nyanza, becomes tributary to the Nile. Lak Tanganyika and Nyasa fill the deepest parts of the western rift-vall while Lake Rukwa is only a huge swamp formed by the collection of loc waters in a subsidiary rift, which to some extent links together t disconnected portions of the main rift.

Climate, Flora and Fauna.—The climate of East Africa is infl enced by the monsoons; the wet and dry seasons are well marked, b occur at different times of the year in different parts of the country. C the coast a high temperature prevails subject to little change, with corr sponding moisture of the air. The mountainous regions enjoy a mo temperate climate with sometimes decidedly cool mornings and evening The plateau has a more continental climate with frequent hot wind Malaria occurs often, but rarely in a serious form where the comforts of civilised mode of life are available. The vegetation of East Africa vari according to the degree of moisture contained in air and soil. Whe rivers or monsoons supply moisture dense forests cover mountain side a river bank. On the coast many useful plants and trees from India, su as the mango tree, flourish, while coco-nut and other palms are commo The river mouths are mostly fringed with dense growth of mangrove. T plateau has a steppe character: on it various kinds of mimosa and t baobab occur; grassy plains are also met with, and the Marenga Mkali a Magunda Mkali are arid deserts with next to no vegetation. The fauna very interesting through the varieties of antelope which swarm on t plateau in great numbers. Giraffe and buffalo, and, with the exception the elephant, most pachyderms are still plentiful, so are lions and oth beasts of prey. Nearly all the rivers harbour a wealth of fish and ma crocodiles. Birds are numerous, but only a few are notable for brillia plumage; amongst running birds the ostrich stands foremost. Of inse ants deserve special notice. The white ant is a common plague of settle and the so-called "siafu" wander everywhere in millions acting scavengers. The tsetse fly, which brings death to most domestic anima infests certain localities of the country. Locusts have repeatedly appeare

People and Trade.—The population of East Africa belongs chie to the Bantu race, which in its migration from the south met t advance of Hamitic and Nilotic tribes coming from the north. T Bantu race is best represented by the tribes round Lake Nyasa, t Hamitic element by the Masai near Kilimanjaro. On the coast live t Suahili of mixed origin, who are remarkable for a degree of Asiatic cultu and the fact that they have been able to impress a knowledge of th language upon almost all the tribes of the interior. These native tribes a

mostly ruled by despotic chiefs, though small self-governing communities are not uncommon. Many tribes, especially those on the grass lands, rear cattle, but only a few are truly nomads. Nearly all till the soil with iron hoes of their own manufacture. Their productions -ground-nuts (*arachis*), maize, rice, sesame, beans, &c., together with those they collect in the forest, rubber, copal, fibres, lichens, &c., are exported in yearly increasing quantities. Of industry they possess little ; unable to produce textiles beyond a small attempt on the coast, they in some parts work a fine bark into cloth. Almost everywhere they smelt iron, and forge fine spear-heads. Pottery and wood-carving are much practised. Payable minerals have not been discovered. There is little intertribal trade ; people from the interior, chiefly Wanyamwezi, travel in caravans to the coast, where they barter their produce for European goods. The staple article of trade is calico from Indian and American looms. The sale of guns, ammunition and spirituous liquors is subjected to severe control. Coast trade is chiefly in the hands of Indians, while European enterprise is mainly directed towards plantations, on which only free labour is employed. Slave dealing has been made a penal crime. A special coin of rupee value has been introduced, but the old silver dollar is generally used as a basis of calculation where the use of coin has superseded the practice of barter, which is still nearly universal.

Government.—East Africa was acquired by private enterprise in November and December, 1884, when treaties were concluded with influential chiefs which were sanctioned by the German Government in February, 1885. The colony is administrated by a Governor with a deputy, who is also commander of the forces. Each department of administration is under the charge of a separate officer. Justice is administered in two law courts, one in the Northern the other in the Southern Division. The governor, with the assistance of a judge, presides over an appeal court. The colony is divided into six coast divisions, and ten station districts in the interior, all under responsible officers, whose chief duty is to maintain order in, and amicable relations with the natives of, their districts. They are supported by a police force. A regular four-weekly mail service exists between Germany and the colony, in which a number of post-offices provide for postal communication. No less than ten missionary societies endeavour to spread culture amongst the natives—six of these are German, three English, one French ; seven of them are Protestant, and three Roman Catholic.

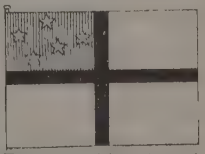

FIG. 450.—*The Flag of German East Africa.*

Some of the coast settlements quite merit the appellation of "town," although less than a decade ago hardly any one of them contained a habitable house. Now all government and most private buildings are handsome edifices ; those of military character are built very substantially of coral blocks, and are capable of withstanding a siege. Private houses

are constructed of lighter material, but are replete with all the comfo which a thorough study of the climate can suggest. Foremost, wit regard to its appearance as in all other re spects, stands *Dar-es-Salaam*, which is pro bably the best harbour on the whole eas coast of Africa. On entering the bay the ey is at once struck with the air of tidiness whic pervades the place. All round the bay run a broad street flanked on one side by hand some public buildings, all fronting the wate The Governor's sumptuous residence stand in the midst of large gardens where man plants are reared on trial. A number of dee wells supply the town with good water fo drinking, and since they have been dug a neighbouring swamp has bee drained, so that it has become not only a handsome but also a health tropical town.

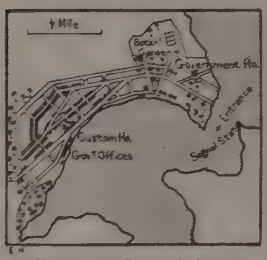

FIG. 451.—*Dar-es-Salaam.*

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III.—PORTUGUESE EAST AFRICA

By Captain Ernesto de Vasconcellos,[1]
Portuguese Royal Navy.

Position and Extent.—The Portuguese possessions in East Africa formerly known in their entirety as Moçambique (or Mozambique), stretc along the coast from the Rovuma, 10½° S., to a short distance south o Delagoa Bay, almost in 27° S., with a coast-line of 1,400 miles. In th north the coast is much indented with many islands lying off it, and i the south it is low, beset with sandbanks and bordered by many sand-hil and lagoons. The most inland point in the Possession is Zumbo on th Zambezi, 450 miles from the sea, and Moçambique includes the easter shores of Lake Shirwa and Lake Nyasa.

Surface.—The Zambezi, which forms a great delta on the coas divides the country into two nearly equal parts, to the north the provinc of Moçambique, to the south that of Lourenço Marques. North of th Zambezi granitic formations give rise to a mountainous country, in whic the Namuli mountains rise to 8,800 feet, and form a sort of hydrographi centre whence flow the rivers Likungu southwards, Ligonia eastwards, an Lurio north-eastwards. Mount Mlanje south of Lake Shirwa, and the Serr

[1] Translated from the Portuguese.

Morumbala, which reaches 4,000 feet, may also be mentioned; but there are other important elements of the orography which space makes it impossible to enumerate.

South of the Zambezi the Serra da Gorongoza rises to 6,500 feet, sending its waters to the Zambezi and Pungwe, and the edge of the so-called Manika plateau runs southward, with Mount Doe rising to 7,900 feet. In the south the well-marked Libombo Range separates the Lourenço Marques district from the Transvaal. There are numerous rivers, many of which are navigable by light-draught vessels. The Limpopo, Save, and Pungwe are the most important in the south. The Zambezi, however, is the greatest waterway in East Africa, approached from the sea either through the winding Quelimane branch, or the shorter and deeper Chinde mouth. Its tributary, the Shire, coming from Lake Nyasa, is also navigable.

Climate and Resources.—According to the latitude, there are varieties of climate; but generally the low coastal plain is malarious and unhealthy owing to inundations from the rivers and the formation of swamps. In the interior, where the effects of latitude are corrected by altitude, the climate is bearable and sometimes good. Farther south, in the part beyond the tropic including Inhambane and Lourenço Marques, the climate is generally better adapted to Europeans. The mean temperature in Lourenço Marques is about 75° F., but the minimum falls sometimes below 65°.

The products are almost entirely derived from the forests; oleaginous seeds, wax, gums, orchil, coffee, tobacco, and ivory being the chief.

People and Government.—The population is made up of various races and tribes. In the north, between the Rovuma and Angoche rivers, the Makwa people dwell, and farther in the interior the Ajaus, both belonging to the eastern branch of the great Bantu race. In the ancient Tete district are found the Maraves, Sengas, and other tribes; south of the Pungwe the Vatwa race inhabits Gazaland. The Portuguese call the various races living near Inhambane, who have adopted the manners and customs of the Vatwas or Manguni, *Ladins*; the Tongas are people of an inferior race living on the banks of the Motamba and around Inhambane.

The colonial province forms a Governor-Generalship, and is divided into the districts of Moçambique, Lourenço Marques, Inhambane and Zambezia. A great part of its territories is under the administration of chartered companies; the Nyasa Company is supreme between Lake Nyasa and the Rovuma; the Moçambique Company is developing the gold and other resources of Sofala and Manika; and the Zambezia district is managed by the Company of the same name, but without sovereign rights

Towns and Trade.—The most active commercial town is *Lourenço*

Marques, on the large and safe harbour of Delagoa Bay in the south. I importance rests on the railway which runs for 57 miles through Portugues territory before entering the Transvaal, and thus forms the shortest outle for that colony to the sea. *Beira*, at the mout of the Pungwe, is somewhat similarly situate the head of navigation on the river being co nected by railway with Salisbury in Souther Rhodesia, forming the shortest route to th place from the sea. *Chinde*, on the Zambe delta, and *Quelimane* have been developed b the transport trade on that river. The o capital, *Moçambique*, situated farther north o an island near the coast, has not profited much by the recent development. Portugue East Africa does not as yet carry on much trade with the mother country The commerce of its ports consists mainly of goods in transit, and take place chiefly with the United Kingdom, India, France and Germany.

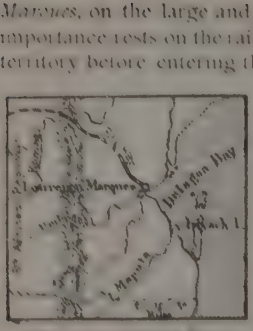

Fig. 454.—Adapted from

STATISTICS (*approximate*).

Area of Portuguese East Africa in square miles	301,160
Population " " "	3,120,000
Density of population per square mile	10
Population of Moçambique	8,000
" Lourenço Marques	7,000

IV. BRITISH CENTRAL AFRICA

By Sir Harry H. Johnston, G.C.M.G., K.C.B.,

Formerly Commissioner and Consul General administering British Central Africa.

Position and Boundaries. British Central Africa is the nam given officially to the large territory under British protection in Sou Central Africa, to the north of the Zambezi. This designation is, on th whole, the most correct and the most comprehensive, and is that recognise by the Foreign Office, which controls the administration of this territor Portions of British Central Africa, however, are sometimes styled Northe Zambezia, or Northern Rhodesia, and Nyasaland.

British Central Africa includes within its limits almost the whe northern watershed of the river Zambezi and its affluents; it furth extends to the Lualaba or Upper Congo (which river rises within th territory); to the southern shores of Lake Tanganyika; to the weste and eastern shores of Lake Nyasa; and to the eastern shores of La Chilwa. It covers the whole of Lake Bangweolo, and a large part of La Mweru within its limits. Further, it may be said that it is bounded on t north by the Congo Free State, on the north-east by German East Afric on the south-east by Portuguese East Africa, on the south by the Zambe and on the west by Portuguese West Africa.

Configuration.—The physical configuration is that of a vast plateau, eeply cut into on the east by the trench of Lake Nyasa (Lake Tanganyika n the north continuing the line of this remarkable rift), and worn down outhwards into the valleys of the Shire, Luangwa, Kafue, and Zambezi. s principal rivers are the Zambezi,[1] the Shire (the next in importance olitically, though not as regards length of course), the Kafue, the Luangwa, ne Kabompo, and the Lungo-e-Bungo. All of these belong to the Zambezi ystem, and have innumerable affluents of their own. The rivers joining ne Congo system which flow through British Central Africa are, amongst thers, the Chambezi, the Luapula, the Lohombo, and the Kalungwisi. The river Saisi, which rises in the north of British Central Africa, is the rincipal affluent of the salt Lake Rukwa, which lies beyond the territory. The lakes of British Central Africa are: Tanganyika, Nyasa, Bangweolo, Mweru, Moir Lake, the Mweru Salt Swamp, and Lake Chilwa. The two ast are salt lakes; but there is a tendency in Tanganyika and Mweru owards brackishness. The only great lakes, veritable inland fresh water eas of great antiquity and relatively unchanged in area, are Tanganyika nd Nyasa. Lakes Bangweolo and Mweru are shallow depressions which he Upper Congo has turned into lakes of varying extent. Lake Chilwa is kewise shallow and swampy, and is possibly a former gulf of Lake Nyasa cut off by the upheaval of a low ridge of ground. Lake Tanganyika ossesses actually a marine fauna, and it has been conjectured consequently hat it is the relic of a former extension of the ocean into the heart of Africa in the Cretaceous period. Lake Nyasa is a curiously formed trench lug into the central African plateau, as though a gigantic spade had been driven eastward into the tableland at a slant, digging deep down on one ide, and throwing up the ground on the other into the form of the Living-tone Mountains. The western shore of Lake Nyasa is shallow, but it deepens owards the east coast, where its depths are so profound that they are in many places much below the surface of the Indian Ocean. Immediately above these great depths along the east coast rise the precipitous Living-tone Mountains, attaining heights of from 5,000 to 10,000 feet. The water of Lake Nyasa is absolutely fresh, and its fauna has no signs of marine origin. Tanganyika drains intermittently into the Upper Congo by the river Lukuga; Lake Nyasa drains into the Zambezi by the Shire river, and, but for an interval of sixty miles of rapids, is in direct water communication with the Indian Ocean. The tableland of British Central Africa is tortured here and there by Earth movements or by atmospheric agencies into lumps and ridges and tilts which are styled mountains. So far as is yet known, the highest altitude is attained at the extreme south-

[1] The name of this great river is relatively constant from near its source to its mouth, and appears to be derived from an old root—*mbiji* or *mbezi*, which in many Bantu languages means *fish* or *meat*—though this resemblance may be accidental. Preceded by various prefixes the name of the river may appear as Liambiye, Liambiji, Diambizi, Dombazi, Dzambezi, Zambezi; but on the whole Zambezi, besides being long since sanctioned by custom, is the most generally recognised native name.

eastern corner of the territory by the beautiful mountain of Mlanje, an isolated block of tableland which has given rise to a series of volcanic craters that further add to its height. The highest point of Mlanje is 9,683 feet. Along the western versant of Lake Nyasa the tableland occasionally top altitudes of 7,000 and 8,000 feet. An altitude of 7,000 feet is occasionally reached by points on the Nyasa-Tanganyika Plateau and in the mountains to the south of Lake Bangweolo.

Geology.—The geology of British Central Africa appears relatively simple. The commonest formation, perhaps, is a mixture of metamorphic rocks, grauwacke, clay, slates, gneiss and schists. The principal mountain ranges consist mostly of granite; and granite with its upper layers often rotten, and even turned into red ferruginous clay, constitutes the surface soil of most of the highlands. There is an outcrop of sandstone on the north-west and north-east coasts of Lake Nyasa and west of the river Shire, at the south end of Tanganyika, round about Lake Mweru, and in the countries adjoining the river Luapula. Volcanic lavas and tuffs are present on the upper plateau of Mlanje and at the north end of Lake Nyasa. There is a good deal of quartz in the mountains to the west of Lake Nyasa. The low flat hills in the upper Shire district and on the north-west coast of Lake Nyasa are composed of marble. The valleys of the Luangwa and the upper Zambezi are covered with alluvial soil. Gold has been found to the west of Lake Nyasa, and is probably present in the Shire highlands. It is found in some abundance in the valleys of the streams which flow into the central Zambezi. Iron is found nearly everywhere except in the alluvial river valleys. Copper exists in the Luapula basin, graphite has been found in Nyasaland, and deposits of coal are present in most of the sandstone formations. The average annual rainfall is about forty inches. The climate on all the plateaux is very agreeable. It is not the climate which causes ill health, but the rank soil, which requires to be chastened by many years of tillage before the country is fitted for permanent settlement.

Flora and Fauna.—The whole of this area is covered with fairly abundant vegetation, in some places reaching typical tropical luxuriance. Nearly all the more important or valuable trees of tropical Africa are represented, and there are five species of indigenous palms, including the oil-palm of West Africa, which extends its range to the west coast of Lake Nyasa. There are four kinds of rubber produced in the forests, and a valuable article of export is the *strophanthus* drug. A notable feature in the flora of British Central Africa is the possession of two species of conifer found growing on Mount Mlanje, and possibly on a few peaks to the north. These are the only conifers known to exist in tropical Africa with the exception of those found on the mountains of Abyssinia and Mount Kenia. One of these conifers is the *Widdringtonia whytei*, a tree resembling the cedar in appearance, but really related to the cypresses.

The fauna of British Central Africa is that of typical tropical Africa

It possesses some West African species, but several forms characteristic of South Africa and the Sudan are absent, such as the ostrich, any species of oryx antelope, the aard-wolf, all mountain zebras, and the secretary vulture. The mass of African antelopes is abundantly represented — especially notable in numbers are the sable antelope, the eland, the kudu, the pallah, the hartebeest, and the water-buck. The African elephant is still found in considerable numbers, and so is the rhinoceros. The low-lying parts of the territory are infested with the tsetse fly, which there renders impossible the keeping of horses and cattle; but this pest is quite absent from the highlands, and moreover tends to diminish in the low country as human settlement increases.

People.—The native inhabitants belong entirely to the negro stock, and to that section of it which speaks Bantu languages. There is, however, not much correlation between race and language where the Bantu negroes are concerned, and the inhabitants of British Central Africa evidently arise from a fusing of three negro stocks: the east coast negro, physically more akin to the tribes of the Eastern Sudan; the west coast negro (the extreme development of the negro type); and an underlying stratum of the Bushman or pygmy race, which undoubtedly inhabited the country before it was invaded by the big black negroes from the north. The tremendous race disturbances in South Africa in the early part of the nineteenth century sent north-west across the Zambezi a Zulu invasion. The invaders were akin to the Matabele, but were known as Angoni. These Angoni constituted a ruling caste in the centre of the territory between Lake Nyasa and the river Luangwa. Similarly Barutseland, on the upper Zambezi, was invaded by Bechuana; though later on the indigenous race expelled its Bechuana rulers and set up a dynasty of its own. The most important people of Nyasaland are the Yao, invaders from the east, who with the aid of the Arabs would have conquered all Nyasaland but for the intervention of the British. They are physically a very fine race, with an undoubted future before them. The inhabitants of Nyasaland proper are the Anyanja, a stock which furnishes the native tribes of all but northern Nyasaland, and of the whole lower Zambezi. The Barutse and kindred tribes are connected linguistically with the people of Lower Guinea and the Congo basin rather than with the inhabitants of the eastern half of this territory, who in language approximate more to the Zanzibar group. The various tribes dwelling round the north end of Lake Nyasa and the south end of Tanganyika and Lake Bangweolo, speak languages which are remarkable for their archaic form and their approximation to the original mother tongue of the Bantu. The entire native population of this vast territory probably does not exceed three millions. Before the arrival of the Angoni and other recent invaders, there were a few great chiefs of ancient lineage, but these are now all swept away or much reduced in power. The only chief of any importance and independence is the king of the Barutse. In the middle of the nineteenth century

the eastern part of British Central Africa was invaded by Arabs and half-caste Arabs from Zanzibar, who, but for their quarrel with the British and consequent defeat, would have succeeded in founding powerful Arab sultanates round Tanganyika and Nyasa. Very few Arabs now remain in the territory.

Government and Trade.—The whole of British Central Africa was brought under British protection between 1889 and 1891. The Chartered Company of South Africa shared in the task, and has been assigned the central portion of British Central Africa as a sphere for its administration, Barutseland remaining under the intelligent rule of its enlightened chief, and the eastern part of the territory, where Europeans were chiefly settled, being controlled by a direct Imperial administration working under the Foreign Office. Little or no commerce at present exists in any other part of the protectorate but the last named. Here the trade amounts to an annual value of nearly $750,000. The main staple of export trade is coffee. The coffee-tree was introduced by Scottish planters in 1876; the parent tree coming from the Botanical Gardens in Edinburgh. The coffee grown in British Central Africa is equal to the finest Mocha, and attains practically the same prices on the London market. The output of coffee from the infant plantations in 1897 was about 450 tons, and the coffee-plant has been adopted as the colonial badge. Other articles of export are ivory, gold, *strophanthus* drug, rubber, rhinoceros horns, wax and hides. The system of internal communications is mainly along the natural waterways. The country is ordinarily entered by the Zambezi at the town of Chinde on the Indian Ocean. The Zambezi is navigable all the year round as far as its confluence with the Shire, and the Shire is likewise navigable all the year round as far as Chiromo. From this point roads, more or less carriageable, have been constructed to Lake Nyasa, and a railway is in contemplation. Lake Nyasa is navigated by several commercial steamers and is patrolled by three British gunboats. There are one British steamer and several British sailing vessels on Lake Tanganyika. The British South Africa Company has sailing boats on Lake Mweru. Elsewhere on this main line of road the only means of communication are the native paths, which criss-cross the country in all directions. Transport along these routes is effected by native porterage. A telegraph line from South Africa passes through the British Central Africa, and a railway from Rhodesia reaches far into the interior. There are at present no towns of any size. The largest settlement of Europeans is *Blantyre;* the administrative capital of the Protectorate is *Zomba*.

FIG. 453.—*The Badge of British Central Africa.*

General Character and Statistics.—The essential characteristics of British Central Africa are those of a great tropical dependency, which may in time become peopled by many millions of black men, but which

s not suited any more than India for European colonisation. Europeans can maintain fair health on the more elevated districts, but the country is emphatically not one where the European can make a permanent home or be anything more than a temporary settler as planter or trader. The country as a whole is unhealthy; but as money is made very quickly over coffee planting, and as there are considerable gold mining prospects the European immigrants slowly increase. The entire European population in the year 1898 scarcely exceeded 450 souls, of whom all but a few are British subjects. Nyasaland is celebrated for its thriving settlers of Scottish race, who have been the main agents in bringing this territory within the sphere of British interests. The area of British Central Africa can only be given approximately while the western frontier with Portugal remains unsettled. It may be roughly stated at 300,000 square miles. The average value of the trade with Great Britain at the institution of the Protectorate in 1891 was about $185,000. It has now risen to about $750,000 in annual value. The revenues of the British Central Africa Protectorate during the same period have risen from nil to about $110,000 per annum. The deficit in the cost of administration is met by the Imperial Government. The responsibility and expense of administering the Central Portion of British Central Africa are borne by the Chartered Company. There are eight missionary societies — five British, two French, and one Dutch—at work in this field.

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Sir H. H. Johnston. "British Central Africa." London, 1897.
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CHAPTER LI.—WEST AFRICA

I.—SPANISH WEST AFRICA

By Edward Heawood, M.A.

Canary Islands.—The Canaries are a group of volcanic island upheaved, between 27° and 30° N., along the north-westerly slope of Afric towards the Atlantic depression. The five principal islands, Lançerot Fuerteventura, Gran Canaria, Tenerife, and Palma, run in a curved lin from east to west, while Gomera and Hierro (Ferro) lie a little off th curve towards the south-west. The moisture brought by the trade wind (especially in winter and to the northern slopes) make the group less barre than the opposite mainland, and the luxuriance of the vegetation increase towards the west; but the plains of basaltic lava are distinctly ari Perhaps the most characteristic plants are cactus-like Euphorbias. Th famous Peak of Tenerife (Pic de Teyde), 12,200 feet hig reaches far above the clou belt. The vines, bananas an other fruit trees of the low slopes give place in turn higher levels to forests laurels, oaks and pines; species of tree-heath and broom (retama), grasses, an highest of all, a violet occurs, but all above 10,000 feet is barren. Thre different races inhabited the Canaries in ancient times, the best know being the Guanches, probably allied to the Berbers. Known vaguely the ancients as the Fortunatæ Insulæ, the group was first conquered 1402 by the Norman De Béthencourt, but in spite of Portuguese efforts obtain a footing was finally confirmed to Spain in 1479. The chief town are *Santa Cruz*, in Tenerife, the seat of Government, and *Las Palmas*, Gran Canaria, whose port, *La Luz*, has been developed as a coaling statio for steamers on the South African route. Wines, cochineal, oil, cereal and tobacco are the chief products of the group.

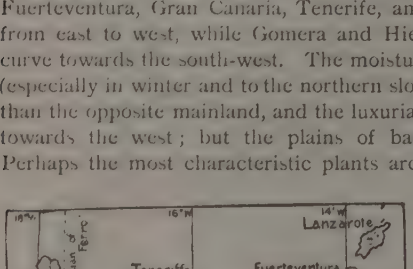

FIG. 454.—*The Canary Islands, showing the assumed meridian of Ferro.*

The meridian of Ferro, the most westerly known land in the days Ptolemy, was long accepted as the initial meridian for reckoning longitud and on the discovery of America was the dividing line between th "Eastern" and "Western" hemispheres. In 1634 the meridian wa assumed to be exactly 20° west of Paris (17° 39′ 45″ west of Greenwich and this is still used as the zero of longitude on some maps.

Spanish Sahara.—The Spanish Sahara extends along the west coast of the desert between Capes Blanco and Bojador, with an average width of about 170 miles. It consists of a granite plateau with vegetation only in the depressions, roamed over by predatory nomadic tribes. While the early relations of the Portuguese and other nations with these coasts for the purpose of trade and fishing were confined chiefly to Arguin, south of Cape Blanco, the Spaniards of the Canaries established themselves in 1476 at Santa Cruz de Mar Pequeña, north of that cape, and at other posts, but their fortresses soon fell into ruins. In 1878 they again turned their attention to these coasts, and a protectorate was proclaimed in 1884, but their efforts to obtain a footing in the interior (Adrar) have been without result, that country being recognised as French in 1900. The principal factory is at Rio de Oro, a spot which was known at a very early date, as it is shown on the Catalan map of 1375.

Spanish Guinea.—Spain owns a small area near Corisco Bay, just north of the equator, but the territory is almost valueless for trade, as French expansion has entirely cut it off from the interior.

Fernando Po.—Fernando Po is the largest and the nearest to the coast of the four volcanic islands which run in a south-westerly direction into the Gulf of Guinea in a line with the volcanic peak of Kamerun (Fig. 465). It has roughly the shape of a parallelogram, of which the northern half is almost entirely filled by the great peak of O-Wassa or Santa Isabel (Clarence Peak), 9,350 feet high, an extinct volcano with a still existing crater. It slopes steeply on all sides but the south, where it is joined by a low ridge to the basaltic cordillera which runs east and west through the south of the island. Most of the surface is clothed with dense forest, but there are also some grassy uplands. The native inhabitants are the Bubi, a Bantu tribe. The island was discovered by the Portuguese, but ceded to Spain in 1778. *Santa Isabel*, on the north coast (occupied early in the nineteenth century by Great Britain), is the only town. Some cacao, coffee and cinchona are cultivated, but the climate is unhealthy to Europeans.

Annobon, the last of the four islands, is also the smallest.

STATISTICS.

	Area (square miles)	Population.
Canary Islands	2,900	292,000
Spanish Sahara	70,000	100,000 (?)
Spanish Guinea	9,000	(?)
Fernando Po and Annobon	800	30,000

II.—FRENCH WEST AFRICA

By M. Zimmermann,[1]

Of the "Annales de Géographie," Paris.

History.—The beginning of French influence in West Africa may be traced back to the discoveries of Dieppe sailors on the coast of Senegambia in the fourteenth century. The attractions of the gold of Bambuk and the

[1] Translated from the French by the Editor.

slave trade led to the origin of Gorée, near Cape Verde, and the firs attempts at penetrating the interior, particularly those of André Brue fro 1697 to 1723; but the real development of French interests only com menced with the able administration of Colonel Faidherbe (1854–1865 He extended the colony of the Senegal from the coast towards the interio and pointed to the upper Niger as the next object of French ambition. I 1866 France possessed only the Atlantic coast from Cape Blanco to Sierr Leone (except Gambia and Portuguese Guinea) as well as the upp Senegal; the vast expansion of this territory has taken place since 188 As Faidherbe had conquered the Marabout El Haj Omar, his militar successors overthrew the Toucouleur empire of Ahmadou by a series o glorious victories, conquered the Almamy Samory, and from 1883 to 189 pushed the French arms from Bammako, the first post on the upper Nige to Timbuktu. Thus the colony of the French Sudan was added to those o Senegal and the Southern Rivers (Casamance, Pongo, Mellacorée, &c.). Th French rights on the Ivory Coast have been acted upon since 1884, an Dahome was definitely conquered in 1892. All of these colonies, includin Dahome since 1902, are combined in the General Government of Frenc West Africa (*Gouvernement général de l'Afrique Occidentale Française* Since 1895, when, in consequence of the treaty of 1890 with the Unite Kingdom, France lost all rights to the central Sudan, being confined to th north of a line drawn from Say on the Niger to Barrua on Lake Cha French exploration and conquest have mainly been directed towards th unknown region lying within the great bend of the Niger and forming th hinterland of the Guinea Coast colonies. The convention of 1898 d finitely fixed the British and French positions in the Sudan, modifying th Say-Barrua line to the advantage of France towards Sokoto and Zinde and moving its starting point down the Niger from Say to Ilo. Inte national rivalry in this region has had at least the one good consequence o a great increase in geographical knowledge. The extent of the equatoria forest and of the bush, the course of the coast rivers Volta, Komoé, Sa sandra, Bandama, Kavalle, the course and the characteristics of the Nige itself, are all definitely fixed, and the work of Hourst, Toutée and the fellows, crowns the labours of Mungo Park, Caillié and Barth.

Configuration.—The geology and the relief of French West Afric appear to be fairly simple. As far as the Niger it forms an undulatin region of plains or low plateaux diversified occasionally by small graniti areas rising to a greater height. In the bend of the Niger the elevation o 3,500 feet is rarely reached or surpassed; although the peak of Komono, nea Kong, reaches 4,600 feet, and that of Hombori, in Masina, is between 2,50 and 3,000 feet. There are no continuous mountain chains; the hypothetic Kong Range has been effaced from the map by the expeditions of Binge but there are great plateaux of ancient rocks covered with red ferruginou earth or laterite. These play an important part in determining the wate sheds of the vast surrounding plains with their gentle and undecided slope

By far the most important is the plateau of Futa Jallon in which the Senegal, the Gambia, the Niger, and a multitude of smaller rivers take their rise. It is the great reservoir for the waters of this part of Africa. With a length of about 200 miles from north to south it presents an abrupt face towards the east, and descends in a gentle slope to the Atlantic on the west. The high plains which compose it rarely reach elevations exceeding 2,500 or 3,000 feet; but it is connected with the plateaux and mountains of from 3,000 to 4,000 feet which form the hinterland of Sierra Leone and the Mandingo Mountains east of the Niger. The bend of the Niger contains the plateaux of Sikasso, Kipirsi and Mossi, with elevations of about 2,000 feet, and a great number of scattered highlands. All the rest forms a plain covered with sand or clay, usually red in colour. The great development of Archæan and ferruginous rocks explains the particular richness of all West Africa in gold and iron. Gold has been produced from a very ancient time in Bambuk, on the Faleme, and in Wangara; and at the present day it is employed by natives in trade, and is worked in Futa Jallon at Bure, and in various parts of the Niger bend.

Climate, Hydrography and Productions.—In West Africa, as indeed in the greater part of that continent, climate is the most important element of differentiation between regions. Between the Sahara and the Gulf of Guinea it determines all the zones of transition from the arid desert to the great equatorial forest. The northern border of Senegambia and the Sudan, although visited by regular summer rains, has a very dry character; it borders immediately on the desert region from which there is an important trade in typical products of arid countries—gums (*Acacia verek*), ostrich feathers and salt. Further towards the south the rainy season is longer, and the number of rainy days increases from 35 per annum on the Senegal to 84 on the Casamance and 137 on the Rio Nunez in French Guinea. The duration of the storms increases also from a few hours to several days. The arid northern desert, dotted with acacias and other thorny plants, and raising horses and camels, gives place to the open woods of the Sudan with clumps of baobabs and *karité*, cultivated fields yielding harvests of rice, maize, millet, hemp, cotton and sesame, and herds of cattle and flocks of sheep on the plateaux of Futa Jallon and Mossi. Finally, south of 8° or 9° N., stretching for a breadth of from 100 to 200 miles to the Guinea Coast, comes the belt of tropical forest, where the principal commercial products are all derived from trees, especially from the oil-palm (*Elæis Guineensis*), various woods, india-rubber, kola-nuts, mahogany, &c. The temperature of the forest region of the Ivory Coast and Dahome, shows the typical equatorial uniformity, averaging from 75° to 80° F.; and the year is divided into two dry and two wet seasons.

The hydrography corresponds to these divisions. The Senegal, 1,000 miles in length, and the Niger, with a length of 2,500 miles, draw the supply of their upper courses in a large number of tributaries from the southern Sudan; but when they reach the latitude of 15° N. both begin to shrink in

the desert area where no affluents reach them. The Niger, however, r
enters the equatorial zone and again receives notable tributaries after
great sweep to the north. Unfortunately neither of these great rivers is
valuable a means of transport as could be desired. The rapids of Kayes
the Senegal, and those of Bammako, Ansongo, and Bussa (where Mun
Park met his death) on the Niger, putting a stop to through navigation.

Peoples.—The ethnology of French West Africa is a confusion whi
has not yet been satisfactorily disentangled. On the Senegal the Moo
(Braknas, Trarzas, Duaish) of mixed Hamitic and Negro blood are noma
devoted to stock-raising and to the trade in gums and salt. They live
the right or Saharan bank of the river, and also in the Sahel between t
upper Senegal and the middle Niger. Towards Timbuktu and t
northernmost part of the great bend of the Niger the French have to de
with the Tuareg Berbers (Kel es Suk, Kel Antassar, Iregenat) and with t
Arabs, both peoples living amongst laborious populations of Negroes (So
rhai) whom they have enslaved. In the Sudan properly so called and
the western colonies the dominant race is the Peulh or Fula, a pastor
people of coppery complexion and of slender figure, whose origin
obscure; and the Toucouleurs, an enterprising warlike and very fanatic
race of mixed Fula and Negro blood. All the peoples named above a
Mohammedans, Islam being the sole, or at least the dominant, religion
the desert, the banks of the Niger below Segu and of Futa Jallon. T
other peoples are of Negro race and practice fetishism; the chief are t
Mandes or Mandingos (Sarrakole, Malinke, Bambara), who are an ag
cultural and warlike people; the Wolofs and Serere on the Senegal coas
and the Susu, Agni, and Ewe on the Guinea coast. The people inhabiti
the bend of the Niger are extremely complicated in their affinities; it
sufficient to mention the Diula, most
whom are small traders. Finally t
marshes of Guinea and the equatorial fore
shelter the remnants of many conquer
tribes approaching extinction, people wh
have become degraded and lead a pure
savage life, being often cannibals.

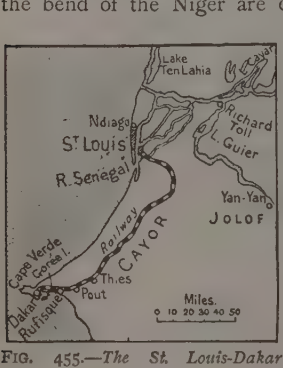

FIG. 455.—*The St. Louis-Dakar Railway.*

The Colony of Senegal.—As t
oldest colony, that of Senegal presents t
most regular development. It is a fl
country as far as Bakel, 400 miles up t
navigable river. The climate, althoug
tropical with summer rains, is subject
the influences of the desert, and this i
fluence is also to be seen in the often ba
and burnt soil, the thorny vegetation, the use of the camel, and t
mingling of the Moors with the Fula and Toucouleur elements of t
population. All the ports of the colony, *Gorée, Rufisque,* and especial

akar, on a magnificent bay, lie to the south of Cape Verde and are nited to the capital, *St. Louis*, at the mouths of the Senegal, by a railway 140 miles, with its terminus at Dakar (Fig. 455). St. Louis is one of ne finest towns of West Africa, and also one of the oldest. The trade f Senegal deals principally with ground-nuts cultivated in the colony, nd gums coming from the desert.

French Guinea.—The old colony of the Southern Rivers (*Rivières du ud*) now called French Guinea (*La Guinée française*) includes (with the xception of the three rivers of Portuguese Guinea) the basins of the umerous coast streams which flow from Futa Jallon to the Atlantic etween the British colonies of the Gambia and Sierra Leone. Since 1897 uta Jallon and its capital, *Timbo*, have been occupied by the French. he low unhealthy Guinea coast peopled by the remains of beaten races, anjaks, Nalus, Bagas and Jolas, who are being driven towards the west by ne stronger Fulas and Mandingos, seems to be one of the most promising arts of West Africa. It supplies a great abundance of india-rubber and round-nuts, and seems capable of also yielding coffee, cacao, and kola-nuts. he port of *Konakry* has in recent years acquired real importance, and is ttracting the trade of Futa Jallon. French Guinea has also a special nportance with regard to communication with the Niger, and a road has een constructed behind the territory of Sierra Leone, to bring the upper iger at Faranna into relation with the port of Konakry. The construction f a railway between these points has also been begun.

The Ivory Coast and Dahome.—Both the Ivory Coast (*La Côte 'Ivoire*) and Dahome form parts of the French establishments of the Gulf f Guinea, although they are separated on the coast by the British Gold oast Colony and the German Togoland. The coast is bordered by sand-ars shutting in marshy lagoons and overgrown by mangroves and dense ush. The constant surf along the shore renders landing very difficult, he rollers on the shallow margin of the sea acquiring tremendous force. A wharf has been constructed at Kotonu in Dahome to overcome these angers as far as possible. The special importance of the Ivory Coast lies n its large rivers, the Sassandra on the west, the Bandana in the centre, nd the Komoe to the east. The efforts of explorers have eventually resulted n establishing communication between the upper parts of these rivers and he Bani-Bagoe, a tributary of the upper Niger; but unfortunately all these ivers are broken by rapids not far from the coast. The Ivory Coast produces certain amount of gold at Baule and Attie, timber, especially mahogany, alm-oil and palm kernels. The old warlike and bloodthirsty kingdom f Dahome has now been pacified, and its trade consists mainly of the xport of palm-oil and kernels, while its imports are those of the whole uinea Coast—cloth, spirits and firearms. The principal stations on the vory Coast are *Bingerville (Ajame)*, *Grand Bassam*, *Assinie* and *Grand, ahu*, each on a sand-bar separating a great lagoon from the sea, while hose of Dahome are *Kotonu*, *Agoe*, *Great* and *Little Popo* and *Whyda*.

The Senegambia-Niger Territories.—These territories, former the French Sudan, are the part of French West Africa which has awakene the liveliest hopes and called forth the greatest efforts in France. T afford it an outlet to the sea a railway was commenced in 1880 from Kay on the Senegal, which for a long time had its terminus at Bafulabe, furth up the same river, but has now almost reached Bammako on the upp Niger. With the same object the projects of a trans-Saharan railway fro Algeria, and of a trans-Nigerian railway from Konakry have been serious brought forward. These are only projects, but their magnitude demo strates the remarkable isolation of the Sudan, shut in by the plateaux Futa Jallon on the west, the equatorial forests of the Guinea Coast on th south, and the Sahara on the north, and measures the importance of ope ing up communications with that promising country. It explains also th enormous value of the navigable Niger, the upper and middle courses which, as far as Ilo, have been co firmed to France by the Franc British Convention of 1898. T hope of being able to extend Fren territory on the right bank of t Niger below the rapids and secure direct communication wi the sea has had to be abandone but the convention concedes t principle of making the Niger international waterway by creati two French enclaves in the Nig territory below Bussa to serve river ports for commercial pu poses. The convention also officially makes the French colonies of t coast continuous with the French Sudan. It now remains to open up a utilise this vast region, which as yet is merely held in military occupati by small garrisons scattered over the country in many places, includi Siguiri, Segu, Bandiagara, and Timbuktu in the upper Niger count Wagadugu and Nikki in the Niger bend, and Zinder between the Nig and Lake Chad. The native population of the region has been decimat by long-continued wars.

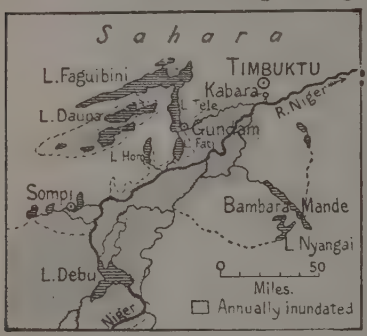

FIG. 456.—*The Surroundings of Timbuktu.*

French Congo.—The foundation of French Congo dates back to t French settlements on the Gabun in 1843, while its immense territor development is due to the patient explorations and enlightened administ tion of Savorgnan de Brazza since 1875. Its area is about three times th of France, and although its boundaries are not yet all defined, it inclu the basins of the Gabun, Ogowe (a river 500 miles in length), and t Niari-Quillu, and stretches along the right bank of the Congo from Stan Pool to the Ubangi. Since 1890 the explorations of Crampel, Miz Maistre, Clozel, Gentil and Marchand, have extended French Congo nor wards beyond the Sanga River to Lake Chad, including the basin of the Sha

nd eastwards to the Nile watershed. The convention of 1898 gave rance the right to the eastern shore of Lake Chad. The right bank of e Ubangi, the course of the M'bomu and of its tributaries are dotted with rench posts—Bangui, Bangaso, Zemio, Rafai and others. The great fficulty is that of communications through the forests of the Crystal ountains from *Loango*, the chief seaport on the coast, to *Brazzaville*, e capital of the colony, situated on Stanley Pool. A railway has been rojected, but not commenced. The people, mere remnants of conquered ibes, the Pongos, Balumbos, Ashangos, or primitive dwarf races like the koas, are but poor material for successful colonising; they are besides ppressed by the Fans or Pahouins, a robber tribe. Thus the colony yields ttle save natural products, india-rubber, ivory and wood, and a little palm-l; its trade as yet is only one-quarter of that of the Congo Free State. he primeval forests of the Ogowe are the home of the gorilla, the largest nthropoid ape.

STATISTICS.

(Estimates only.)

	Area sq. miles.	Population.	Trade in dollars. Imports.	Exports.
Senegal and dependencies	96,000	200,000	6,000,000	2,000,000
French Guinea	42,000	?	750,000	1,150,000
Ivory Coast	106,000 [1]	1,250,000	750,000	700,000
Dahome	143,000 [1]	?	2,000,000	1,850,000
French Sudan, French Congo, &c. ..	1,000,000 ?	?	2,000,000	110,000
Total of French West Africa ..	1,387,000 ?	?	11,500,000	5,810,000

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F. Foureau. "Au Sahara." Paris, 1897.
— Toutée. "Dahome, Niger, Touareg." Paris, 1897.
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III.—LIBERIA

By Edward Heawood, M.A.

Extent and Surface.—The Negro Republic of Liberia occupies about 00 miles of the Guinea coast immediately to the west of Cape Palmas, the oint at which the rounding off of the western limb of Africa begins. Sierra eone lies to the west, while the north and east are surrounded by French Vest Africa. Liberia is entirely confined to the basins of the coast reams (the chief of which is the St. Paul), nowhere extending quite 150 iles into the interior. The coast is, as a rule, high, the series of lagoons so haracteristic of the more eastern coasts of Guinea being here but slightly eveloped, owing possibly to the greater exposure to the Atlantic gales.

[1] To 9° N.

Behind a narrow strip of mangrove and pandanus swamps traversed
the lower courses of the streams the country rises in one or more st
which are marked by the occurrence of rapids in the rivers. The gre
part of the surface appears to be covered by forest, for as the inter
frontier is still undefined, it is uncertain whether the republic includ
any large area of the open plateaux of the Mandingo country.

History and Government.—Liberia had its origin in a settlem
of freed slaves—named Monrovia in honour of the United States presid
—formed by the American Colonisation Society in 1821. The territory w
gradually extended by the incorporation of successive strips of coast. I
in 1847 the settlers were placed under a republic
constitution. Treaties with native chiefs brou
large interior districts under the nominal p
protectorate of the republic, but in 1884 the t
was curtailed by the agreement with France, wh
fixed the eastern frontier at the Cavalli riv
The Manna river is the boundary on the side
Sierra Leone. The official language is Engli

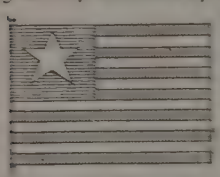

FIG. 457.—*The Liberian Flag.*

The well-known Krumen are the most important tribe. No white man c
be, nor become a citizen. The principal exports are timber of the forests and
plantations, including [illegible] coffee, palm-oil and kernels and sug
besides *Monrovia*, the capital, the chief port is *Grand Bassa*.

STATISTICS (*estimates*).

Area of Liberia (in square miles)	[illegible]
Population of Liberia	[illegible]
" [illegible]	[illegible]

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Sir H. H. Johnston. "Liberia." 2 vols. London, 1906.

IV.—BRITISH WEST AFRICAN COAST COLONIES

By Sir Harry H. Johnston, G.C.M.G., K.C.B.,

Africa Medal, Thanks of the Houses of Parliament, and the Commons.

Historical.—The British West African colonies include the Gamb
Sierra Leone, the Gold Coast, Nigeria, the last-named being formed in 18
to include Lagos, the Niger Coast Protectorate, and the territory former
administered by the Royal Niger Company. The Gambia was an Engli
settlement in the days of Queen Elizabeth, and the Gold Coast settlemen
date back to Charles II., in which reign also the British hold on th
Gambia was strengthened. Sierra Leone was founded towards the clo
of the eighteenth century out of purely philanthropic reasons for th
repatriation of African slaves. Lagos was taken in 1800 in order to st
the slave trade. The Niger Coast Protectorate was acquired betwee

84 and 1888 for the purpose of protecting British markets from foreign
on by Germany and France. About 1885 all these West African colonies
ere on the point of being connected almost without break of continuity
ong the coast, but the British Government shrank from the responsi-
lity of supporting the zealous local officials, consular and colonial. The
ps thus left open were promptly filled by France and Germany, and
erefore the British West African colonies at the present day are scattered
d of relatively small extent.

THE GAMBIA

Position and Surface.—The colony of the Gambia (and in esti-
ating the area of these colonies the foolish and fine distinction between a
lony proper and protectorate or sphere of influence is ignored) consists
a narrow strip along the banks of the river Gambia from its mouth to
e cessation of navigability at a point about 200 miles from the sea.
uch of the land is low lying and swampy, though above MacCarthy
land the country along the banks becomes a little more hilly. The river
ambia is one of the few really satisfactory African rivers as regards
vigability; there is never less than twenty-six feet of water on the bar at
freme low tide. Why it is not more highly rated as one of the few good
rbours of the west coast of Africa the writer is at a loss to understand.

Climate, People and Resources.—This colony possesses a fairly
althy climate for West Africa; it is far less unhealthful than any other
itish West African possession. Lying much further north than the
her colonies it has an appreciable winter, and from November till March
e climate is actually good. The rainfall is not more than 44
ches per annum, and is restricted mainly to the summer months. The
sources of the country are entirely agricultural and the principal
oduct is the ground-nut (*Arachis*). Other articles of export are hides,
es-wax, palm kernels, india-rubber and rice. The flora and fauna
long more to the Ethiopian sub-region than to the West African: there
e no anthropoid apes, but most of the big African mammals, such as the
affe and the larger antelopes, are present.

The natives chiefly belong to three different stocks, the Wolof, Felup
d Mandenga (or Mandingo). There are also a few Fulas in the north.
e Wolof are the handsomest of all negro races, very black, but with
most European features. The Mandenga and Felup are of light brown
mplexion, with hair which tends to be long and wavy rather than closely
rled. They are evidently negroid rather than negro and in a greater
gree than the Wolof exhibit Hamitic affinities. The Felup, on the other
nd, belongs to a marked and ugly negro type. The languages which
ey speak seem to offer a far-off resemblance in structure to the Bantu
nguages of central and southern Africa. The Felup are chiefly pagans,
t most of the other negro and negroid peoples of the Gambia are
ohammedans.

Besides agriculture, cotton is grown, woven and dyed by the native and these manufactures are often exported to other parts of West Afric "Gambia cloths" enjoy great local renown.

The system of intercommunication is almost entirely by water. Government steamer runs weekly to and from the capital, Bathurst, at t mouth of the river, to McCarthy Island, about 150 miles inland. *Bathu* is the one town of any importance. The trade of the Gambia h diminished of late years, and less than half is with the British Empi

SIERRA LEONE

Boundaries, Surface and Climate.—Sierra Leone is bound on the north and west by French West Africa, and on the east a south-east by Liberia. The northern half of the territory is moderate mountainous, the hills even extending to the coast at the Sierra Leo peninsula. The southern part is low and swampy, especially in t Sherbro district. The climate of all Sierra Leone is unhealthy, but t coast decidedly so; yet some improvement is discernible, and there less loss of life amongst Europeans at Freetown than in former da when it was called "the white man's grave." The all-year-round te perature is high, averaging 83° F.; and the rainfall heavy, said to rea the extraordinary average of 138 inches at Freetown, but diminishi considerably in the interior, where it probably does not exceed 50 60 inches per annum. The country is traversed by a good many river the more important of which are the Great and Little Scarcies, the Rok and the Bamopamo or Sherbro river, many parts of which are unexplore The Rokel is navigable for 40 miles from the sea, and the Sherb river for about twenty miles. Other means of communication are simp the narrow African paths and human porterage, though there is a go deal of canoe navigation on the lagoons and creeks which break up t indelinite coast line in the south. Horses are in use amongst the nativ of the far interior, but will not thrive on the coast. The highest mounta is Mt. Daro, 4,396 feet in height. On the northern versant of the ran from which these mountains rise the Niger takes its source.

Flora, Fauna and People.—The flora and fauna of the coast b of Sierra Leone are typically West African. The chimpanzee is still fou in the Sherbro district, the only part of West Africa where anthropo apes are known west of the Cameroons. The vegetation along the coa is extremely luxuriant; in the mountains of the interior, however, whe the rainfall is less, the land is much barer and forest only exists patches.

The native population is entirely negro or negroid, belonging to t Mandenga and Timne stocks. The Mandenga form the bulk of the rac in the north-eastern part of the colony, but have pushed their way to t coast in various places through the more truly negro peoples, with who

ney are now to a great extent mixed. The Timne, Bulom, and other allied eoples are absolute negroes, belonging to a stock which forms the main oast population between the river Gambia and the borders of Liberia. hey speak languages which in structure, though not in vocabulary, offer a triking resemblance to the Bantu family. At Freetown and one or two ther points on the coast there are large settlements of Krumen, a race robably indigenous to Liberia. The coast peoples are pagan or nominally hristian, and those of the interior are Mohammedans, many of them sing Arabic characters for writing.

Government and Trade.—Patches of territory along the coast are irectly administered by the Colonial Government. he interior still remains under the rule of native hiefs supervised by travelling commissioners. There re few or no manufactures, and agriculture is much eglected. Trade chiefly takes place in the wild pro-ucts of the country, such as palm-oil, kola-nuts, ndia-rubber, copal, oil-seeds and ginger. Hides are xported, and also cattle to a slight extent. A small rade is done in tropical fruits such as pineapples, hich are exported to Great Britain. The only town of any importance is *reetown*, the capital at the mouth of the Rokel river, with the best harbour r all West Africa.

FIG. 458.—*The Badge of Sierra Leone.*

THE GOLD COAST

Surface and Climate.—The British possessions on the Gold Coast re bounded on the west and north by French territory, and on the east y the German colony of Togoland. The country is generally low-lying, ith the exception of a range of hills stretching north-west from the lower olta into Ashanti. It is doubtful whether the land anywhere reaches a eight exceeding 2,000 feet. The principal river is the Volta, navigable by nall boats not more than 60 miles from its mouth, and rising very far in ne interior, right up in the bend of the Niger, in two long streams, the lack and the White Volta. The river Ankobra is navigable for about 50 iles. The Pra was long remarkable as the boundary between Ashanti nd the rest of the Gold Coast in its upper waters. The rainfall varies xtraordinarily; in the western districts near the coast probably exceeding 00 inches per annum; in Ashanti and other interior districts ranging from 0 to 70 inches. The eastern part of the colony is much dryer, though its w-lying and swampy nature makes it equally unhealthy. Round about ccra there is a remarkable dry patch in which the annual rainfall carcely reaches 18 inches. The climate everywhere seems to be terribly nhealthy for Europeans; the two chief maladies are black-water fever nd dysentery. The mean temperature for the year is 85°.

Flora and Fauna.—The fauna and flora are those of the typical Vest African region. As far as is known there are no anthropoid apes.

The antelopes are chiefly represented by the genus *Cephalophus*, a low a primitive type of antelope. A guinea fowl (*Agelastes*), also of low ty exists, and there is a great abundance of monkeys and baboons, includi the Diana and Colobus (the latter furnishing the monkey skins of co merce), and the great Mandrill baboon. The flora of the Gold Co is very little known, and would probably yield surprising results if vestigated.

People and Government.—The natives are a fairly homogene type of West African, except in the north, where there has been some sli intermixture with a higher negroid race. The stock to which the inha tants belong is related linguistically (except in the extreme west) to races of the Lower Niger, and, in an extremely distant way, to the Ba group. In the west the people have more affinity to the Kru tribes Liberia.

The coast belt, and now Ashanti also, are directly administered the Imperial Government. Elsewhere in the interior the people governed by their native chiefs under the supervision of travelling co missioners. The Gold Coast Colony is the best governed and most pr perous of British West African possessions; and though it is disastrous the loss of life it entails to Europeans, it is of great importance to Brit commerce.

Trade and Towns.—There are almost no manufactures, nor agriculture much developed; nevertheless trade in the wild products the country is considerable. The chief articles of export are: india-rubb palm-oil, gold, kola-nuts, monkey skins, ivory and timber. In the east part of the Gold Coast poultry of all kinds thrive remarkably, and exported as provisions for ships, mainly at Kwita. The rivers of western part of the colony roll down from the mountains the gold d which for centuries has given this country the name of the Gold Co Gold mining might be carried on to a more considerable extent were not for the climate. The most important town is the capital, *Accra*, a other trading towns are *Cape Coast*, *Elmina*, *Kwita*, and *Axim*. Nat towns where there are no European settlers vary so much from year year in extent or existence that they are hardly worth enumerating; the capital of Ashanti, *Kumasi*, will probably remain the administrat centre of that district. *Salaga*, an important native city of an enti Mohammedan character, came definitely under British influence in 18 when the mountainous country to the north of the Volta, formerly a neut zone, was divided between the Gold Coast and German Togo.

Means of communication are very bad. The rivers are mostly unna gable, or only navigable by means of native canoes. The vegetation extremely luxuriant, and even the native paths are frequently blocked. the dry and open country of the far interior horses are in use, and the eastern districts they can be kept in good health and condition n the coast.

LAGOS AND THE NIGER COAST PROTECTORATE

Position, Boundaries and Surface.—Lagos and the Niger Coast Protectorate may be appropriately considered together, for they are naturally conterminous and geographically similar, and though separate for some purposes, they form part of Nigeria as one administration. They are bounded on the west by the French possessions of Dahome and Porto Novo, on the north by the part of Nigeria formerly the Royal Niger Company's territory, and on the east by the German colony of Kamerun. Lagos lies entirely to the west of the course of the main branch of the Niger, while the Niger Coast Protectorate occupies most of the rest of the delta.

Much of this land on the Niger delta is, of course, flat and swampy;

FIG. 459.—*The Niger Delta. Creeks not accurately surveyed are dotted.*

but high land is not very far away from the coast regions. There are hills rising to over 1,000 feet—even, it is said, in places to 3,000 feet—in the protected States at the back of the limits of the actual colony of Lagos. There are mountains of perhaps 6,000 feet at the extreme east of the Niger Coast Protectorate, within the loop of the Cross River, which, under the name of the Rumbi Range, are connected with the great volcanic peak of Kamerun just outside British territory. To the north of the Cross River the land is undulating, and probably rises into hills before the territories of the Royal Niger Company are reached. A great deal of the land of the Niger delta, though only a few feet above the level of the sea, is free from marsh, and has even an exceedingly pleasant aspect, as in the well-cultivated Ibo country. The river system is mainly composed of the Niger river and its well-nigh innumerable offshoots or their

independent tributaries, and of the Cross River which, except near its estuary, is quite separate from the Niger system. From the borders of the Kamerun district to the east of Dahome—almost to the Gold Coast on the west—there is a system of intercommunicating lagoons and creeks all along the coast-line. If certain narrow creeks were annually cleared of vegetation, it would be possible to pass in a native canoe from the German Kamerun to the eastern border of the Gold Coast colony without going out to sea (Fig. 459). Over all this territory the network of deltaic branches affords the most remarkable facilities for transport by water. On the other hand, the movements of any land force are seriously impeded, and the native paths through the jungle are little used, except in the Cross River region, a dry and fairly elevated country. Some of the mountainous region on the eastern frontier of the Niger Coast Protectorate appears to be of volcanic origin; elsewhere the hills are masses of granite and disintegrated granite, forming the hard, red soil which is the formation of the higher land, the remainder of the country being purely alluvial, and formed by the detritus brought down by the Niger.

Climate, Flora and Fauna.—The climate of all this region is excessively unhealthy; it is perhaps the unhealthiest part of Africa. Yet the natural products are so rich, and trade is so profitable, that there is probably a much larger proportion of Europeans here than in other West African possessions, and life is more comfortable and in some respects more civilised. The mean annual temperature is about 84°, and it is very rarely indeed that the thermometer in the lowlands goes below 75°; while the rainfall is seldom less than 100 inches annually, and sometimes reaches 130 inches. In the districts along the upper Cross River a far more pleasant climate is attained, with cool nights, and even an appreciable cold season. The rainfall there is not so heavy, possibly not more than 70 or 80 inches per annum. With the hot sun and abundant rainfall the forests are beautiful to a degree of luxuriance scarcely equalled elsewhere in Africa, except possibly in parts of the Gabun. The banks of the rivers within reach of the tidal influence are bordered with gigantic mangroves, which rise in a tropical forest of great density, singularly beautiful in places, and magnificent in its scenic effects. The tree of trees of the Niger delta is the oil-palm. This district produces the best palm-oil in all Africa. The fauna is more disappointing to the eye, though the abundance and variety of the lower forms of life makes up for the comparative scarcity of mammals and birds. The elephant still lingers in the uninhabited parts, even quite near to the coast, and I have more often seen wild elephants in the Niger Coast Protectorate than in any other part of Africa, even the river Congo. On the other hand, it is doubtful if anthropoid apes are found anywhere in the lower Niger. A remarkable lemur (the Potto)

FIG. 460.—*The Badge of Lagos.*

culiar to this district. The most prominent birds are the grey parrot d the large blue plantain eater (*Schizoris*).

People.—The inhabitants belong to several distinct stocks. They are absolute negroes, yet on the upper Cross River, people with finely-cut atures may be met with from time to time, and here, as among the Efik ople of Old Calabar, the skin is yellow-brown rather than black. Some the tribes in the almost unexplored parts of the Niger delta are singu-ly savage-looking—black-skinned and low-browed, seeming to represent me stranded stratum of very old type. Cannibalism is extraordinarily evalent except where European influence has long prevailed. The ople of the upper Cross River fatten slaves for months before killing em. A rough classification distinguishes: (1) The Yoruba-Jekri stock, hich would also include the Jebus and other peoples round Lagos; (2) he Bini stock, or the people of Benin and Sobo; (3) The Ijos, or the ople of the central Niger delta near the coast (Bonny and Brass), who, e the Bini, appear to have been the earliest settlers in the delta; (4) The wos of the district between Opobo and Old Calabar; (5) The Ibo of e districts between the Lower Niger and the Cross River; (6) The Efik ople of Old Calabar; (7) The tribes of the upper Cross River; (8) The kwa, between the Cross River and the Kamerun watershed (the last e groups speak what may almost be called semi-Bantu languages); and) the few tribes speaking Bantu languages on the extreme south-eastern rder of the Niger Coast Protectorate. This district appears to have been ry populous in times past, so much so that the struggle for existence eated a gigantic traffic in slaves, which attracted Europeans, and even oduced a certain amount of half-indigenous civilisation. The kingdom Benin was a State of some antiquity which had apparently acquired me knowledge of art and industry from the Niger districts, which in eir turn had been partially civilised by Mohammedan influence. The ilisation of Yoruba is entirely Mohammedan, and almost all the people that country belong to that religion; which also exists at Lagos, but ewhere in the Niger delta is quite unknown. The Yoruba people are dinarily amply clothed, and this style of Mohammedan clothing has also tended in some degree to the town of Lagos; but where untouched by lam the people are extraordinarily nude, even when to some extent ilised by contact with Europeans. In the eastern part of the pro-ctorate women go entirely nude before they are married, and do not ear any appreciable clothing afterwards. Men were formerly so careless this score that chiefs of considerable wealth, even able to read and rite English, have had to be rebuked by the writer for appearing at his nsular court without a particle of clothing except a peaked cap. Where ohammedanism does not prevail the religion is a form of Fetishism. uman sacrifices are the order of the day, and the religion is probably ore bloody and cruel than anywhere else in savage Africa.

Trade.—The total value of the annual trade of Lagos and the Niger

Coast Protectorate is probably about twice as great as that of the ot British colonies on the coast taken together. The principal exports palm-oil and palm-kernels, rubber, kola-nuts, copal, gum, shea-butte little coffee and a little ivory. With the exception of leather work, the weaving and dyeing of cotton garments in Yoruba and Lagos colo there are practically no native manufactures in the country. The pe of Old Calabar, however, have a pretty taste for carving ivory and dec ting brass plates, and these articles are sometimes exported as curiositi

Administration and Towns.—As regards political divisions: Government of Lagos in 1898 included the colony proper, which small strip of coast between Porto Novo and Beni number of small adjacent kingdoms, treated as tected States, and a sphere of influence which cluded the large countries of Abeokuta and Yor Lagos is a crown colony under a governor, assisted an executive legislative council. Southern Nigeri under the charge of a High Commissioner, whose of government is at *Asaba*. Other important to are *Idda*, near the boundary of Northern Nige and *Akassa* at the Nun mouth of the Niger.

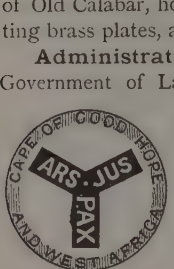

FIG. 461.—*The Protectorate Badge.*

The principal towns of the Niger delta are *Lagos*, *Brass*, in the east division of the Niger Coast Protectorate, *Bonny*, *Opobo*, *Old Calab* There are also the following trading stations where Europeans reside *Badagry*, *Leki*, *Akorodu*, *New Benin*, *Forcados*, *Kwo-ibo*, and *New Cala* (no connection with Old Calabar). In addition, towns of importance, eit for historical association or for trade, are *Epe*, *Abeokuta*, *Ibadan*, *Odcon Benin*, *Bende*, *Oguta*, and *Aron*. The population of these towns va from 100,000 to 5,000 according to local circumstances, such as goodness or badness of their rulers, the state of trade, or the influence Europeans. None of them, except perhaps Abeokuta and Benin, of any permanence in the way of buildings. A railway has been c structed from Lagos to Abeokuta, a distance of 50 miles.

STATISTICS.

(*Estimates for the most part.*)

	Area (square miles).	Population.	Europeans.	Exports.	Imports.
The Gambia	2,700	150,000	50	$750,000	$600,000
Sierra Leone	30,000	3,500,000	250	$2,250,000	$2,250,000
Gold Coast	53,000	2,000,000	800	$4,250,000	$4,250,000
Lagos and Niger Coast Protectorate	80,000 (?)	6,000,000	1,000	$8,000,000	$8,000,000

POPULATION OF TOWNS (*estimated*).

In the Gambia :—Bathurst, 6,000.
In Sierra Leone :—Freetown, 30,000.
In Gold Coast :—Accra, 16,000; Cape Coast, 11,600; Elmina, 10,500.
In Lagos and the Niger Coast Protectorate :—Lagos, 30,000; Old Calabar, 15,000; Brass, 10,000; Opobo, 10,000; Bonny, 6,000.

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V.—NORTHERN NIGERIA

By Lieut.-Colonel A. F. Mockler-Ferryman

Position and Extent.—That portion of the south-western Sudan he Niger basin which was developed by the Royal Niger Company a coast-line extending from the Forcados River on the west, to the mouth of the Niger on the east, a distance of 100 miles, being ged in between the various districts of the Niger Coast Protectorate. nd the boundaries were less clearly defined, though its limits north- ds have been fixed by the Anglo-French Agreement of 1898 as a line vn from a point ten miles above Ilo on the Middle Niger to the point ntersection of the 14th parallel of north latitude with the meridian ing 35′ east of the centre of the town of Kuka, on Lake Chad, such being so traced as to include within the Niger Company's territories whole of the Empire of Sokoto. On the west, the area was bounded the colony of Lagos, and by the hinterland of French Dahome, le its north-eastern boundary to the south of Lake Chad runs with western boundary of the German Kamerun colony as determined by Anglo-German Agreements of 1885 and 1893. The tract of territory cribed thus roughly—for the actual boundaries have not so far been eyed—includes an area of some 500,000 square miles, with a population roximately estimated at thirty millions, within which there naturally ts a great variety of country and of inhabitants. Practically there e two well-marked zones, separated by the parallel of 7° N., the hern part being now united with the Coast Protectorate under the name Southern Nigeria; it is low-lying, swampy and unhealthy, with pagan abitants. The northern part, now Northern Nigeria, is an undulating, and healthy region, peopled principally by Mohammedans.

The River Niger.—The river system of this part of West Africa is ble, for, if we except the portion of Hausaland and Bornu which lies the edge of the basin of Lake Chad, the whole of Nigeria is drained the river Niger and its numerous tributaries. After flowing past buktu, the Niger enters the territory to which it has given its name s junction with the Dallul Mauri, about 11° 45′ N., from which point, l it eventually empties itself into the Atlantic, it receives many minor rs and streams, none of which, however, add much to its volume except ng the rains. The fall of the river from its source to its mouths averages ly a foot per mile, and in the dry months, even its largest tributary, the

Benue, is unnavigable by vessels drawing more than two feet of wa
The principal tributaries of the great river in its course from Ilo dow
ward, are, on the left, the Mayo-Kebbi, or Sokoto River, from Sokoto a
its neighbourhood, and the Kaduna through Nupe ; while on the right
small rivers that drain the countries of Borgu and Ilorin flow in,
watersheds in each case lying outside the limits of Nigeria. At Lok
in 8° N., the Benue river joins the Niger, which in the very wet sea
it rivals in size. Taking its rise in the Bubanjidda mountains, t
magnificent waterway flows west and south-west, receiving throughout
course of some 700 miles such lesser rivers as the Faro, Tarabba, Do
and Katsena from the south, and the Kedara and innumerable sm
streams from the north. From the Niger-Benue confluence to the sea
distance of about 300 miles. The Niger descends in one large stre
until it reaches the town of Abo in 5¾° N., at which point the de
commences, and the river splits into innumerable interlacing chann
the more important mouths being those of Forcados (Warri), Nun (
principal), Brass, New Calabar and Bonny (Fig. 459). The large L
Chad, to which the north-east angle of Nigeria reaches, receives only
river of any size flowing from the territory, this is the Yobe or Yeou, wh
rises some 450 miles west of the lake.

Surface and Productions.—The land is everywhere fertile, a
produces vast crops with the minimum of cultivation, while many artic
of commercial value are found among the natural products. Of the
palm-oil, rubber, shea-butter, kola-nuts, various fibres, oil seeds a
spices may be mentioned. Valuable timber trees grow in the south
forests, iron in abundance is forthcoming in many parts, tin and gal
have been found in the Benue districts, and ivory is still offered for sale
considerable quantities. Of the fauna it is sufficient to say that
hippopotamus is met with in all the large rivers ; that herds of elepha
roam the forests, most abundantly in the neighbourhood of Lake Ch
and in the country to the south of the Benue ; that various species
antelope are found everywhere ; while lions, wolves, hyænas, civet c
and many varieties of monkeys abound in Upper Nigeria.

People.—The inhabitants may be classified as members of two m
families, Negroes who are still pagans and Fulas who are Mohamm
dans, with a cross between the two known as Negroids, and also
Mohammedan faith. The aborigines were probably pure negroes, a
the Fula element is an introduction of recent times, while
negroids are the result of Mohammedan conquest and subsequ
intermarriage. The Idzo, Ibo, and Igara on the Lower Niger, the Bo
on the Middle Niger, and the Igbiri, Mitshi, and Juko on the Benue
amongst the most important of the many tribes of pagan negroes, eit
wholly independent or only partly under the influence of the Mohamme
Fulas. The languages spoken by these tribes are all different and ab
lutely distinct, though merging into one another on the borders.

remainder of Nigeria, and certainly the most valuable part, is inhabited by the Yorubas, Fulas, Hausas, and Bornus, with languages of their own and, two centuries ago, forming separate nations.

Occupations and Trade.—The pagans are for the most part agriculturists, though cultivating only to an extent sufficient to supply their own wants; fishing and hippopotamus-hunting are indulged in by the tribes dwelling on the river banks, and elephant-hunting by those inhabiting the more inland parts. The collection and manufacture of palm-oil and rubber occupy the attention of the bulk of the coast population; north of the limits of the oil-palm, the European traders encourage the collection of various gums, fibres, oil seeds and spices. The Nupes and northern Yorubas, though mainly occupying themselves with husbandry, are far-famed among Sudan tribes as blacksmiths, workers in brass, leather and glass, as weavers, and as canoe-builders; while the great Hausa nation furnishes the merchant and industrial classes of the western and central Sudan. Hausa merchants convey their wares to all parts of central Africa, to the Mediterranean, to the Atlantic, and even into the countries bordering on the Upper Nile, the chief articles of commerce being cotton-cloth and tobes woven at Kano (the Hausa capital), leather-work, embroideries, and kola-nuts. The Fulas are warriors and slave-raiders, but their original occupation of peaceful herdsmen is still followed by a proportion of the people, who wander throughout the country with their herds and flocks. The numerous waterways afford excellent communications in the delta, while Northern Nigeria is intersected by regular caravan routes, which are, however, merely narrow tracks trodden down by the native carriers and beasts of burden. The trading steamers of the Royal Niger Company ply on the main Niger and Benue for a distance of several hundred miles from the sea, and good roads have been made in the immediate vicinity of the trading stations.

Native Kingdoms.—The various native kingdoms are governed by their own rulers, who in all cases, in return for an annual subsidy, acknowledge British suzerainty. In the Niger delta the semi-independent chiefs are innumerable, but Northern Nigeria consists, besides the minor kingdom of Borgu and such few pagan tribes as have not as yet been conquered by the Fulas, of the two great empires of Sokoto and Bornu (capital Kuka, population 50,000). The **Sokoto** or **Fula Empire**, which comprises the old Hausa States and the once-independent kingdom of Gando, contains seventeen provinces, including Adamawa, Kano, Nupe, Yoruba (Ilorin), and Lafia—the last three owing allegiance to Gando as well as to Sokoto. Each of these provinces is governed by an emir, who is virtually the sovereign of a small kingdom, though liable to be deposed at the will of the Sultan of Sokoto. The system of government and inspection is thoroughly organised, with a complete scheme of taxation for each province, the inspecting officer being responsible that the emirs pay their annual tribute, which usually consists of slaves.

Government and Towns of Nigeria.—The government of Northern Nigeria passed from the hands of the Royal Niger Company into those of a High Commissioner acting directly for the British Government in 1900. The seat of administration is *Zungeru*, on the Kaduna. At the confluence of the Niger and Benue is the small native town of *Lokoja*, whose central situation caused it to be selected as the military headquarters of the Royal Niger Company and provisionally of the new Imperial forces. On the middle Niger the only towns worthy of notice are *Egga*, *Rabba*, and *Bussa*, while *Ilorin*, the northern Yoruba capital, lies about seventy miles south of Rabba on the great trade route between Hausaland and Lagos. The Benue towns, with the exception of *Yola* the capital of Adamawa (population 10,000), are small and unimportant, the principal being *Loko*, the port of Nassarawa, and *Ibi*, which is the Benue headquarters of the Royal Niger Company, with populations considerably under 6,000. The chief towns of the Fula Empire are the capitals of the several provinces, of which may be mentioned *Sokoto* (population 15,000), *Wurno* (5,000), *Gando* (6,000), *Bida* (15,000), *Zaria* (30,000), *Nassarawa* (10,000), *Kano* (70,000), and *Bauchi* or *Yakoba* (100,000), the estimated population in all cases being a mere approximation, and the relative importance of each depending on its situation with regard to the main trade routes of the country. There are no statistics of Nigeria which can be looked on as definite, the organisation of the country having been too recently undertaken to admit of complete surveys or censuses being attempted.

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VI.—GERMAN WEST AFRICA

By Graf von Pfeil.[1]

Togo.—The colony of Togo has not quite 60 miles of coast, which, running almost east and west near the west end of the Bight of Benin, consists of a narrow low strip of yellow sand. Behind this a belt of forest separates the sea coast from the long lagoon which runs parallel to nearly the whole length of it. Some distance further inland there is a lake, which must be considered as belonging to the lagoon system. There is no harbour on the coast and landing is rather difficult through the heavy surf, the "Kalema," which breaks upon the coast all the year round. Togo has a number of rivers; two, which nearly form the eastern and western

[1] Having no personal knowledge of Togo the author has consulted mainly the "Mittheilungen aus den Deutschen Schutzgebieten," and other works cited at the end.

boundaries, the Mono and Volta, are of considerable size, and the latter is navigable in some part of its upper course. Two ranges of mountains traverse Togo from south-west to north-east, and form the hilly southern border of the plateau of the western Sudan. The plateau is an undulating prairie with a slight incline towards the west, and with little vegetation beyond tall grass. Vegetation on the coast is remarkable for the oil-palm, wild coffee, shea-butter tree, rubber plants, baobab and a very good quality of ebony. The climate is not healthy; it possesses the character of the southern hemisphere, the hottest months being December and January, the least warm July and August. There are no people of Bantu race in this colony, whose inhabitants belong exclusively to the Sudanese tribes. On the coast fetishism is prevalent, while in the north Mohammedanism is rapidly gaining ground. The people are agriculturists and good traders; on the plateau they are warlike and constantly at feud with each other. Togo is a German colony, with a governor, a staff of officers, and a police corps of 150 natives, a court of law and a hospital. The governor's residence is *Sebbe*, and there are two government stations in the interior, namely, *Kratji* and *Misahöhe*. *Bismarckburg* is also a trading station.

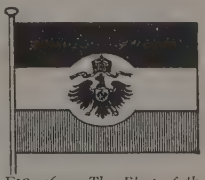

FIG. 462.—*The Flag of the German Protectorates.*

Kamerun.—Position and Surface.—The German colony of Kamerun (the Cameroons) has only about 190 miles of coast on the Bight of Biafra, which is deeply indented by the outlets of a comparatively large number of rivers (Fig. 466). All these have one peculiarity in common, the lowest part of their course turning in a north-westerly direction. The reason for this is found in the "Kalema," a deep sea swell which breaks with great force upon the coast all the year round. The largest indentation is Kamerun Bay, which is an excellent harbour. The coast forms a strip of very low land, narrow in the south and widening to about 30 miles near the bay. East of this the country rises gradually and forms a range of mountains with meridianal direction, a valley separates them from a second steeper rise, the ascent to the main plateau of the African continent, which here presents the form of undulating grassy plains. The plateau extends to about 8° N., where it abruptly descends to the valley of the Benue river, to which its northern slope gives birth. The Kamerun Peak rises from a volcanic rift which reaches nearly to Lake Chad as indicated by the two mountain ranges, Chebchi and Mandara; its altitude is about 12,480 feet. At the foot of the peak rise two gaseous springs, while further up hardly any water is retained by the porous lava, of which the mountain is composed. The greater part of the Kamerun coast is taken up by mangroves, which fringe some of the estuaries far inland; further south, the Batanga coast is grassland. The mountains are covered with dense forest, in which the oil-palm, rubber plants, kola-nut, ebony and the wild coffee tree occur frequently. The

Kamerun Peak is dotted with the same forest up to 8,300 feet, beyond which vegetation diminishes gradually, and ends with short grass, which covers the summit. The fauna is that which is peculiar to tropical Africa but is remarkable for its anthropoid apes, the chimpanzee and gorilla. A number of rivers, some of them, for instance the Nyong and Lokunja navigable for steam launches for a number of miles never exceeding thirty, run into Kamerun Bay. The Lokunja, though the smaller, is navigable for some distance above the rapids, which intersect all the rivers where they break through the range of mountains west of the steep plateau border, whence all the Kamerun rivers descend in high cascades forming insuperable barriers to navigation. The only river likely to prove navigable, even on the plateau, is the Sannaga, which joined by the Mbam, forms the main water-course of Kamerun. The northern part of the country sends its water west to the Benue or east through the Shari to Lake Chad.

People and Government of Kamerun.—Among the inhabitants two groups may be distinguished, the Bantu and the Sudanese. The former live mainly to the south of 7° N., the latter as a rule north of that parallel in the State of Adamawa. The Bantu are great traders, the Sudanese agriculturists, who imported from the north the horse and horned cattle. There is little industry beyond carving in wood and the smelting of iron. For purposes of administration Kamerun is divided into three districts, with leading officials subordinate to the Governor. There are two courts of law, and a number of colonial troops are garrisoned in various stations throughout the country, of which *Mpini*, *Victoria*, *Buea*, and *Yaunde* deserve special notice. *Ri del Rey*, *Bibundi*, *Little* and *Great Batanga*, and *Kribi* are ports of call. *Kamerun* (now known as *Duala*), the chief harbour, is also the seat of the Landeshauptmann, or Governor; it has a custom house, post, and telegraph. In a good hospital colonial officials and missionaries receive medical and other attention gratuitously.

STATISTICS (*Estimates*).

	Area (square miles).	Population.
Togo	23,160	2,500,000
Kamerun	191,130	3,500,000

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VII.—CONGO FREE STATE

By Sidney Langford Hinde,
Formerly Captain in the Congo Free State Forces.

Position and Boundaries.—The Congo Free State (*L'Etat Indépendent du Congo*), occupies the heart of Central Africa, and is crossed by the equator. The great river, the mouth of which was formerly known as

he Zaire, received its name of Congo from the chief of a small tribe in the neighbourhood of Boma, the Portuguese supposing him to be king of the whole country. The Congo is not so called by the natives in any part of ts course, but is known to them by different names according to the district through which it flows. Except for a narrow strip at the mouth of the river, giving access to the Atlantic, the western boundary of the State is the Congo itself, and its great northern tributary, the Ubangi, separating the Free State from French Congo. The river Mbomu is the northern boundary. Eastwards, on the Upper Nile, the State occupies a district on lease from Great Britain; and further south the boundary is the Central African Rift Valley and the eastern shores of Lakes Albert, Albert Edward and Tanganyika, separating the State from British and German East Africa. The southern boundary, towards British Central Africa and Portuguese West Africa, is irregular, not following definite physical features, and in some parts undecided. The range in latitude s from 5° N. to 13° S.; and in longitude from 17° to 30° E.

Physical Features.—The vast country coincides roughly with the basin of the Congo, excluding only the tributaries on the right bank from Manyanga to the mouth of the Ubangi, the northern tributaries of the Ubangi and Mbomu, the eastern tributaries of Luapula, before it enters Lake Mweru, and the head waters and western tributaries of the Kassai. The Congo river, which is about 2,500 miles long, is called at its source the Chambezi, and drains consecutively the four great lakes Bangweolo, Mweru, Tanganyika, and Leopold II. There is some reason to suppose that the drainage from Tanganyika by the Lukugu into the Congo is of recent date. The main river, at Matadi only a few hundred yards wide, is very broad in its middle reaches and studded with myriads of islands. In the section between Basoka and Bangala (Nouvelle Anvers), it varies in width from fifteen to over thirty miles. Many of its tributaries form excellent waterways for hundreds of miles, and vary in width from one to ten miles in the navigable portions. Of these the Kassai, Ubangi, and Lomami are larger in every respect than any rivers in Europe. Generally speaking, all the rivers of the Congo system have a different native name after passing some large physical feature, such as a cataract or lake, a fact possibly due to these natural barriers separating native races or kingdoms.

Taken as a whole the Congo basin consists of flat, high-lying tablelands. There are mountains only to the eastward where the river approaches the Atlantic, and, cutting through them, falls by cataracts to the level of the coast plains. In the interior of the Congo Free State there are no mountain ranges. More than half of the State may be said to consist of continuous forest, probably the largest tree-clad area in the world, not excepting even the Amazon and the Malay Archipelago. Throughout the forest, india-rubber trees grow in larger quantity than in any other known region. As far as is yet known there are only two large lakes, Leopold II. and Matumba actually within the Congo Free State:

but the western shores of Albert Edward, Tanganyika and Mweru form part of the eastern boundaries. Many points as to the geography of the interior are still very indefinite. Rumour has placed a large lake between the Lomami and Lake Leopold II., but it has not yet been discovered or localised. Much of the country is unapproachable by rivers in which canoe navigation is possible, and has therefore not yet been visited by Europeans.

In almost every part of the State iron is found in workable quantities. Copper is less profusely distributed, but the copper mines in the west between the Kassai and the Atlantic, and in Katanga to the south, are extremely rich. The iron and copper are worked by the natives, but up to the present time there has been no search for the noble metals, though the rocks which fringe the Congo basin on every side may eventually prove a fruitful field for the prospector.

Climate.—From the standpoint of European colonisation, the climate of the Congo is bad : all forms of malarial disease are rife owing to the moist heat. But with a better knowledge of tropical diseases, and of the precautions necessary to guard against them, such as the choice of sites for houses and stations, it may be possible for Europeans to settle in the country. Hitherto, the State officials and others have had to live in a most primitive manner since, owing to the difficulties of transport, luxuries, comforts, or even medicines, have been almost unobtainable. The high death-rate of Europeans in the Free State should therefore not be taken as an argument against the attempt to develop the country. The temperature averages about 80° in the shade over the greater part of the country, and during several months in the year violent storms or tornadoes of short duration are very prevalent, which sometimes cause a fall of 30° or 40° in temperature in half an hour.

Flora and Fauna.—The flora and fauna differ in many respects from those of any other country within the same degrees of latitude. In the forest are found ebony, teak, oil-palm and mahogany of good quality, besides many other useful and ornamental woods. Wild coffee, india-rubber, creepers and cotton abound throughout the whole forest region, as do also yams, plantains, papaw and pine-apples. The vegetables cultivated in the country are cassava, maize, rice, pea-nuts, sweet potatoes, bananas, beans, sorghum (Kaffir corn), tobacco and coffee. Immense herds of elephant are found in every part of the Congo Free State, and leopards, buffalo and wild cattle inhabit the plains. A great variety of fish, as well as hippopotami and crocodiles swarm in all the rivers.

People.—There are at present over 100 tribes recognised in the Congo basin, but it is possible that as many more are to be found in the yet unexplored regions. Nearly all speak Bantu dialects, and most of them have been, or are cannibals. None of the tribes are so dark in colour as the Sudanese. Each tribe or race is governed by a chief whose power is absolute ; and large tribes are divided into sections under petty chiefs, who

have complete control in their own districts, but are subservient to the great chief who holds the power of life and death over them in common with all his subjects. Some tribes have absolutely no form of religion, while among the more superstitious races fetish worship, or propitiation of evil powers, exists. As a consequence the "witch doctor" is a power amongst them second only to the chief. The natives in several parts of the country are clever workers in iron, copper and wood. In certain districts such as the Kassai, they weave beautifully ornamented cloths from the palm and other fibrous plants.

Means of Communication and Trade.—The great rivers on the plateau have become the highways of trade, the numerous steamers employed being supplied with wood for fuel from the forests on the banks. The cataracts of the Congo have been the chief obstacle to the development of the country, since transport on the road constructed around them was both difficult and costly. As a result of many years labour in the face of the greatest difficulties, a railway, 250 miles in length, has been built from the extremity of the navigable portion of the lower river, at Matadi, to Leopoldville on Stanley Pool, the base from which the internal trade is carried on. After Stanley had opened the way, the Arab trading chiefs of the east coast—who dealt mainly in ivory and slaves—led many expeditions into the Congo basin, using porterage for transport, the native porters each carrying a load of about 60 lbs. The river trade by steamers and canoes now carries practically the whole available export produce of the State to the west coast. These exports are ivory, rubber, palm-oil, orchilla-weed, several kinds of gum, pepper and coffee. Steamers on the Lower Congo carry on direct trade with Antwerp and Liverpool.

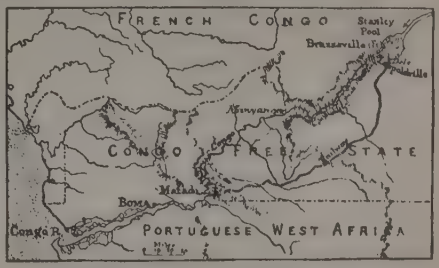

FIG. 463.—*The Congo Railway.*

History and Government.—All efforts to explore the Congo from the sea or to discover whence its vast volume of water was derived were without effect, and the existence of the great inland course of the river was unknown until, in 1876, Sir. H. M. Stanley struck its upper waters in East Africa and followed the river to the Atlantic Ocean. On the initiative of Leopold II., King of the Belgians, a society called *Comité d'Etudes du Haut Congo* was formed in Brussels in November, 1878, with the object of exploring and exploiting the basin of the river Congo, the vast size and importance of which had just been revealed. In 1879, Stanley, accompanied by fifteen Europeans, returned to the Congo, his first aim being to make a practicable road through the cataract region to the upper river.

At Vivi, the highest point of the river navigable from the sea, he established a station directly below the last of the cataracts, and made his road along the right bank nearly due north to Isanghila, after which it took an eastward course, following the river as closely as possible to Manyanga, where he crossed and proceeded up the left bank to Stanley Pool. Here he established the station now known as Leopoldville. At Stanley Pool a steamer was soon launched, and the difficulty of communication with the interior was thus greatly reduced, since from Stanley Pool to Stanley Falls, 1,000 miles further up the main river, steamers of comparatively large size can voyage in safety at all seasons of the year. Mr. Stanley spent five years in the work of exploration, and soon after his return to Europe the society became merged in the *Association Internationale Africaine*. In 1885 the Berlin Congress guaranteed the Congo Free State as a Sovereign Power, and the King of the Belgians—who had borne all the expense from the commencement—was proclaimed sovereign. Five years later the Belgian government advanced a small loan to the embryo State, reserving the right of annexing it as a Belgian colony at a future date. The Arab slave-traders, who raided the western part of the country, had for many years rendered the position of the few Europeans at remote stations exceedingly dangerous; and the military forces of the State were obliged to carry on a campaign against them before the evil influence exercised on the more peaceful natives was destroyed.

The administration of the Congo Free State is carried on by a Governor, two Vice-governors, three Inspectors, and sixteen Sub-commissioners—one for each of the sixteen districts into which the country is divided. These are Banana, Boma, Matadi, the Cataracts and Stanley Pool on the lower river; and on the upper river and its great tributaries, Kassai, Equator, Bangala, Ubangi, Aruwimi, Welle, Stanley Falls, Kwango, Lualaba, Arab Zone, Kasongo and Lulnaberg. *Boma*, the seat of the administrative government, is an active seaport; and *Leopoldville* on Stanley Pool is its commercial complement as a river port. Many of the native villages in the interior straggle for miles along the river banks; but anything like a correct estimate of their population is as yet impossible. The total population of the State has been variously estimated; but since a great part of its vast area has not yet been explored it is hardly possible to say more than that the Congo Free State is well peopled.

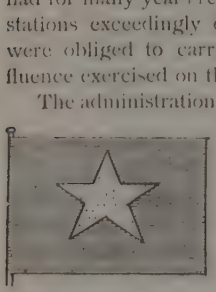

FIG. 461.—*The Flag of the Congo Free State.*

STATISTICS.

(*Rough Estimates.*)

Area of the Congo Free State (square miles)	900,000
Population " " "	30,000,000
European population (1897)	1,474
Population of Boma	10,000

ANNUAL TRADE OF THE CONGO STATE (*in dollars*).

Exports (1895–96)	2,800,000
Imports "	2,800,000

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VIII.—PORTUGUESE WEST AFRICA

By Captain Ernesto de Vasconcellos,[1]
Portuguese Royal Navy.

CAPE VERDE ISLANDS

Position and Surface.—The Cape Verde archipelago is situated in the North Atlantic, 400 miles off the west coast of Africa between 12° and 15° N. It is composed of fourteen islands and islets, divided into two groups, which, owing to the prevailing north-east trade winds, are named respectively, Windward (*Barlavento*) and Leeward (*Sotavento*). The Windward group includes the islands of Santo Antão (St. Antony), São Vicente (St. Vincent), Santa Luzia, São Nicolão, Boavista, and Sal; the Leeward islands are São Thiago (Santiago), Mayo, Fogo and Brava. The islands present an arid aspect from the shore, but in the interior, along the banks of the streams, there is a fairly rich vegetation, especially in rainy years. The islands are volcanic and all contain craters and recent eruptive rocks. The volcano on Fogo, 10,560 feet in height, which was last in eruption in 1857, the volcanic plateau of St. Antony whence a peak of 7,550 feet rises, and the Antonia Peak of 4,870 feet on Santiago, are the most remarkable features.

Climate and Resources.—The climate is better than might be expected from the latitude. The archipelago is situated in the trade wind zone; the north-easterly wind blows from November to July, the *Tempo das Brizas* (Time of Breezes) and naturally the healthiest season. From August to October the *Tempo das Aguas*, or rainy season, prevails, and this is the hottest and least healthy part of the year. During the breezy season the temperature is about 73°, and in the rainy season about 79°. Coffee is the most important product of the Cape Verde plantations; the physic-nut (*Jatropha Curcas*) is more productive here than in America, and grows on all the islands; cereals and sugar-cane are cultivated. Salt, coral, and dried fish, are also of some importance. In the fauna there are neither wild animals nor venomous reptiles. Most of the vertebrates were introduced by the Portuguese colonists. The only

[1] Translated from the Portuguese.

industries worth mentioning are the making of straw articles in Brava, and embroideries and lace in Fogo.

People and History.—The Cape Verde Islands were discovered by Cadamosto in 1456, and first peopled in 1640 by the servants and retainers of the Infante D. Fernando, who took there colonists from Alemtejo and Algarve and obtained negro labourers from Guinea. These elements form the foundation of the present mixed population containing more or less European blood. The colony is under a Governor appointed by the central government in Lisbon. There is a subordinate administration in each island. The principal town is *Praia* on Santiago, the residence of the Governor, and capital of the colonial province. *Mindello*, inside Porto Grande on St. Vincent, which is considered the second town of the archipelago, has an excellent harbour, and is a very important coaling station. Both of these are placed in connection with the Atlantic submarine cables.

STATISTICS.

	1896.
Area of the Cape Verde Islands in square miles	1,480
Population „ „ „	114,000
Density of Population per square mile	77
Population of Praia	4,000
„ Mindello	4,200

PORTUGUESE GUINEA

Position and Surface.—Portuguese Guinea is an enclave in the French West African possessions some distance south of the Gambia River. The littoral is formed by lowlands cut up by numerous water-courses and inlets of the sea. Laterite is formed on the barriers near the coast, and the whole possession consists of undulating country nowhere becoming mountainous. The Geba and the Grande are the principal rivers falling into a wide estuary from which a remarkable tidal bore ascends the Geba, and in the mouth of which lie many islands, the most important being the Bijuga or Bijagos group. These and most of the other Guinea rivers are navigable. On their banks there are forests of valuable timber trees, including mahogany.

Climate and Resources.—The climate is generally unhealthy for Europeans, especially during the April and November rains, when the mean temperature is about 90° F.; the more favourable dry season lasts from December to the beginning of March. Portuguese Guinea is an agricultural and commercial colony. In the littoral zone, rice and maize are grown as the principal food of the natives, who, with the exception of a few warlike and nomadic tribes, are employed in agricultural pursuits. The most important products are pea-nuts, india-rubber, wax, tobacco, indigo and cotton. The kola tree (*Sterculia accuminata*) occurs on the banks of the Geba. Coffee, palm-trees, and all leguminous plants flourish. The fauna includes antelopes, the elephant, panther and many monkeys, while termites abound and are destructive to buildings. Cattle, sheep,

goats and pigs are kept as domestic animals. The natives of Guinea belong to ten different races, which are subdivided into many tribes. The highest races are the Fula, Mandingo, and Biafada, who are constantly engaged in war with each other. The history of the movements of these people is given elsewhere. As a general rule the Fulas are the most numerous and bravest of all the Guinea tribes. The Bijagos inhabit the Bijagos Islands between the Orango and Geba channels; and live as a rule on the produce of the sea. The capital of Portuguese Guinea is *Bolama*, on one of the islands, but *Bissao*, on the shore of the great estuary, is the commercial centre. There are about 67,000 inhabitants in the possession.

PORTUGUESE ISLANDS IN GULF OF GUINEA

São Thomé and Principe.—The islands of Principe and São Thomé (Princes Island and St. Thomas), lie in a straight line with Fernando Po and the Peak of Kamerun, almost bisecting the Bight of Biafra. They constitute a province under a Portuguese Governor. São Thomé is nearly on the equator, 150 miles west by north of Cape Lopez. It has an area of 320 square miles, with a population of 22,000. The littoral zone, covered by dense tropical vegetation, leads up to remarkable mountain peaks of volcanic origin, rising in São Thomé Peak to 7,020 feet. The only commercial port is Anna de Chaves, where the town of *São Thomé* is situated. The dry season lasts from June to September, and is the best of the year; the rainy season occurs between September and June. In the lowlands the temperature ranges from 66° to 81° F.; in the middle zone from 57° to 68° F., while on the highest cultivated land the cold is felt to be unpleasant. The people inhabiting these islands are a mixture of the ancient Portuguese colonists named Creoles, speaking a language somewhat similar to the Cape Verde creole, and labourers under contract from various parts of the African continent. The Angolares, inhabiting the south-east coast of the island near Angra de São João, were originally the survivors from an Angola ship lost on the Sete Pedras Bank.

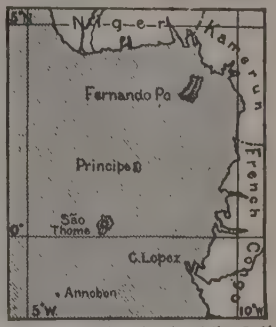

FIG. 405.—*The Islands of the Gulf of Guinea.*

The island of Principe, 90 miles north-east of São Thomé, has an area of only 44 square miles and a population of 2,700. It is covered by even more luxuriant vegetation than São Thomé, but does not possess the alpine species of that island, as the greatest elevation, the Peak of Principe, only reaches 2,720 feet. There are two natural harbours, of importance on account of their size, *Santo Antonio*, the commercial port and seat of the

custom house and local government, and the Bay of Agulhas on the west coast, which has not yet been utilised. The climate is warmer than that of São Thomé and with a greater rainfall.

The products, which make this colony one of the best in West Africa, are : cacao, coffee, cinchona, vanilla, india-rubber and balsam-trees. The species yielding timber are varied and rich. Commerce is entirely carried on by Portuguese ships with the mother country.

ANGOLA

Position and Extent.—The colonial province of Angola, exposed to the South Atlantic, has a stretch of coast line of 1,020 miles from the Congo to the river Cunene. It is bounded on the north by French Congo and the Congo Free State, the latter also forming the boundary on the east, on the south by German South-West Africa, and on the south-east by British Central Africa. It is the largest of the Portuguese colonial possessions.

Surface.—The coast lands are low in the north crossed by hill-spurs and high in the south where the edge of the African plateau approaches the sea. There are numerous natural harbours, some of which, such as Loanda, Lobito, Mossamedes, Port Alexander, and Bahia dos Tigres (Great Fish Bay) are particularly good. Angola is an elevated territory, the great mountain ranges of the edge of the plateau following the curves of the coast. On the north an extensive mountain range forms the watershed between the numerous rivers flowing west to the Atlantic and those flowing north to the Congo, including the great streams of the Kwango and Kassai. The south of Angola is a great plateau descending abruptly towards the sea, forming the "Chella" whence numerous torrents swell the rivers flowing to the ocean. The plateau of southern Angola has an altitude of between 6,500 and 5,000 feet ; the highest peaks are found in the Bailundo regions south of the Kwanza, where the Lovili mountains reach 7,800 feet and the Elonga mountains 7,500. The geological features of Angola, as far as known, include the sandstones of the Congo basin and a part of the ancient schistose zone of West Africa. Cretaceous strata occur between Great Fish Bay and the river Dande, with some exposures of Tertiary (Miocene) rocks. Eruptive rocks occur in the Mezas mountains in Mossamedes. The province is crossed by numerous rivers, many of which are navigable on their lower and middle courses. They belong to five great hydrographic basins : that of the Congo draining the interior of the northern half ; the Kwanza entirely within the colony ; the Cunene which forms the southern boundary and drains most of the healthy Benguela and Mossamedes plateau ; the Cubango in the south, which flows to the inland Lake Ngami ; and finally the Zambezi, draining the entire south-east of the colony up to the Katima rapids.

Climate, Resources and Trade.—The cool ocean-current flowing

long the coast from the south, together with the regular sea breeze, modify the heat natural to the latitude, especially in the south of the colony. In the north and centre, on the coast lowlands and along the rivers, malaria is endemic; but on the highlands of the interior comparative comfort is enjoyed, and on the Benguela and Mossamedes plateau the climate is similar to that of the south of Europe. At São Salvador do Congo in the north of the province, at an altitude of 1,800 feet, the mean temperature observed during four years was 73° F. In Loanda the mean temperature during eleven years was 74·5°, and in Caconda, on the plateau, about 67°. The cool season (*Cacimbo*), lasting from June to September, is the pleasantest part of the year; the rains begin in October and reach their maximum in April, severe thunderstorms being common during the last three months of their duration. The prevailing sea winds from the west-south-west are called "viração," in distinction to the land winds which are called "terraes." In the north, as far as the Kwanza valley, the chief characteristic of the vegetation is a mixture of savannas and groves of oil palms (*Elaïs Guineensis*); the savanna region proper occupies the river valleys and the plateaux; and finally there is a coast strip of poor and scanty vegetation and an arid zone near Mossamedes, in the south, where a desert flora is found. In all these regions up to an altitude of 3,500 feet, and on the river banks, the baobab is found; and the sea is fringed with the mangrove (*Rhizophora Mangle*). Angola exports the produce of its numerous plantations, especially vegetable oils, india-rubber, wax, cocoa-nuts and coffee. Its commerce is carried on with Portugal and other Portuguese colonies.

People and History.—It is not as yet easy to give the necessary data for the study of the people of Angola, but it seems that the first people who inhabited the country were the Bushmen, successors of the Pygmies now represented by the Ba-cancale, Ba-cuisso, Ba-coroca and others mentioned by Capello, Ivens, and Serpa Pinto. They are met with, living in isolated communities, in the south of the province. In the centre and north are the Jagas, invading tribes from the north-east represented by the Bangalas; but the Angola Bantu may be divided into Fiotes in the north, from Chiloango to the Dande; the Bundas from the Dande to the Kwanza, and the N'Bundos in the south up to the heights of Mossamedes. Angola was discovered by the Portuguese explorers of the fifteenth century; the mouth of the Congo was reached by Diogo Cão in 1482; and Diaz, in 1488, sailed along the whole coast. By the beginning of the sixteenth century the Portuguese had important settlements at several points.

FIG. 466.—*The Loanda-Ambaca Railway.*

Government and Towns.—The colonial province of Angola, under a Governor-General, is divided into the districts of Congo north

and south of the Congo river, Loanda, Benguela, and Mossamedes, bordering the coast, and Lunda in the extreme north-east. The capital is the city of *São Paulo de Loanda*, usually known as *Loanda*, a great seaport, with a railway running inland through rich plantations for 200 miles to *Ambaca*. The principal towns besides the capital are *Cabinda* in the Congo district, *Ambriz*, *Benguela*, and *Mossamedes*, all on the coast.

The extent of the trade carried on between Portugal and the Portuguese possessions along the west coast of Africa may be judged from the statistics of 1895, which show $9,850,000 of colonial exports to the mother country, and $8,700,000 of imports from it.

STATISTICS (*approximate*).

Area of Angola province in square miles	457,500
Population „ „	2,000,000
Density of population per square mile	4·4
Population of Loanda	14,000

STANDARD BOOKS.

J. J. Monteiro. "Angola and the River Congo." 2 vols. London, 1875.
J. P. Oliveira Martins. "Portugal em Africa." Oporto, 1891.
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CHAPTER LII.—SOUTH AFRICA

I.—THE COLONY OF THE CAPE OF GOOD HOPE

By Thomas Muir, C.M.G., LL.D., F.R.S.,
Superintendent-General of Education for Cape Colony,
and F. C. Kolbe, D.D.

Position.—The outline of the continent of Africa being familiarly compared to a leg of mutton, Cape Colony may be said to occupy the shank end of it: indeed, "the shank end" is a common nickname for the south-western corner in which Cape Town stands. The northern boundary of the colony was until recently the natural line of the Orange River, but now the territory stretches northward into Bechuanaland, between the German possessions on the west and the two Boer colonies on the east. By means of this extension, and by means of the Bechuanaland Protectorate to the north of it, and Rhodesia still further north, the trade route to the interior lies entirely within British territory. Basutoland and Natal, lying eastward of the Orange River Colony, complete the north-eastern boundary. Separated from the rest of the colony, and almost surrounded by German territory, is a small tract of land around Walfish Bay, the only natural harbour of any importance between Angola and the Orange River.

Coasts.—The seaboard is strangely inhospitable: the harbours are mostly unprotected, and the river-mouths are choked by sand-bars. The one good natural harbour on the west—Saldanha Bay—has hitherto lacked fresh water, though it is proposed to bring a supply from a distance, and so develop the port. At the south-western corner the Cape Peninsula is a striking feature, consisting of Table Mountain facing north, buttressed by a range running southwards, and separated from the mainland by a strip of sandy plain (Fig. 471). In front of Table Mountain, to the north, lies Table Bay, a port which has been robbed of its terrors by a breakwater and capacious docks; and eastwards from the peninsula stretches False Bay, in a snug corner of which, named Simon's Bay, there is a British naval station. The only other important harbours are (in order) Mossel Bay, Algoa Bay and East London. Algoa Bay, in spite of being an open roadstead, is yet so favourably situated for the main trade route, has so thriving a province immediately behind it, and is so well equipped for the receipt and discharge of goods, that its town, Port Elizabeth, justly claims the title of "the Liverpool of South Africa."

Configuration.—The direction of the mountain range which forms the main watershed of South Africa may be roughly indicated by a line drawn

parallel to the coast about 150 miles inland. Inland of this line the great continental slope trends to the west, as is indicated by the many tributaries which go to swell the Orange River; and on the coast side of the range countless rivers and torrents (when there is rain) struggle through the minor mountain defiles on a short and rapid journey to the sea. During the greater part of the year, when there are no heavy rains, many of these rivers are without water, and only dry beds may be seen. The minor mountain ranges are also regularly distributed, running east and west, one of them half way and the other three-quarters of the way between the watershed and the coast; and these too, of course, give origin to their own little streams. Thus the rise to the continental plateau is by well-marked stages; first the shore-slope, then the Little Karroo, then the Great Karroo, and finally the High Veldt. Generalising widely, it may be said that the west coast region consists of barren and rainless tracts of sand; that a wide band lying along the eastern edge of this tract, and having its base from Cape Town to Port Elizabeth, stretches first through fertile mountains and valleys, then through wide plains of scrubby bush, and finally across immense grassy prairies which merge insensibly into the forests of northern Bechuanaland and Rhodesia; and that on the east of this band the verdant undulations of Kaffraria stretch over and beyond the Kei for hundreds of miles, and break up eventually into the tumult of the Basutoland hills and the diversified surface of Natal.

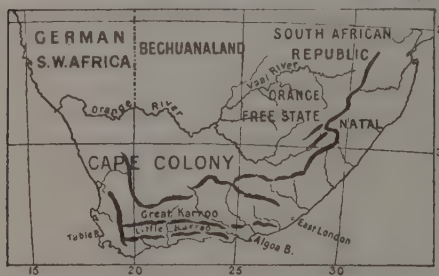

FIG. 467.—*The Mountain System of South Africa.*

Geology.—Geologically South Africa may be regarded as consisting of a central basin of younger rocks surrounded by a belt of older formations, which is incomplete on the eastern coasts. The older rocks comprise a vast series of slates and schists with much intrusive granite in the south-west and to the north, separated by a distinct unconformity from succeeding sandstones, quartzites, and shales. The Table Mountain sandstone is the most important formation of this series, as it forms all the chief mountain ranges in the south-west of the colony, while the auriferous conglomerates of the Transvaal are usually assigned to it. The Central Basin is bounded by a curious series of conglomerates collectively known as the Dwyka conglomerate, which contains striated boulders probably of glacial origin. Within the conglomerate belt lies a vast thickness of gently folded shales and sandstones, the lowest known as the Ecca beds, to which succeed the Karroo and Stormberg beds. The Karroo beds are interesting as yielding peculiar reptilian remains and having a

nsiderable number of diamantiferous pipes, especially near the border Cape Colony and the Orange River Colony, while the Stormberg beds e conspicuous as the South African coal-bearing formation.

The whole of the peripheral area is much contorted, flexured, and ilted; and, as a result of one of the faults on the south, an area built up the younger Ecca beds remains, which points to a former much greater tension of the more recent central formations. The entire region has ffered enormous denudation; and, as many of the formations, especially wards the interior, consist of beds lying almost horizontally, table-like ountains are extremely common.

Climate.—The variation of climate in Cape Colony is dependent on n rather than on temperature, the latter having a comparatively mode- te range. Thus along the sea-coast the thermometer averages 60° F. in e coldest month and 70° in the hottest. During the colder season the othermals run east and west, in the summer time north and south.

There seem to be three regions of rainfall: the Eastern, which gets its in in the hot season; the South-western, with its rainfall in the winter; d the North-western, with practically none all. This arrangement may be explained the direction of the prevailing winds and the mountain ranges. The chief wind summer is the south-eastern, which is the ar-guard of the trade wind strengthened the monsoon effect of the hot-central regions. In the south-west there is tle to check its career as it hurries with moisture to the tropics and reveals itself a rain wind only by clouds on the ountain tops. In the east, however, it has to ascend over the watershed nd much moisture is precipitated in the process. In winter, on the other and, the winds are from the north-west, and those that come directly from e sea drop their rain at the south-western barrier of mountains, while ose that reach the east get there unladen. The high and dry air of the arroo, and the regularity and moderate character of the seasonal changes, ave caused Cape Colony to be increasingly regarded as a desirable health esort, though some complain that long residence has a slightly enervating ffect.

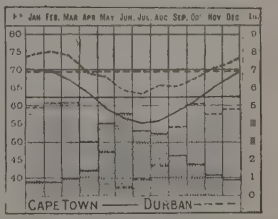

FIG. 468.—*Temperature and Rainfall of Cape Town and Durban.*

Resources and Industries.—The chief farm products are wool, ohair, skins, grain (wheat, mealies, Kafir corn, &c.), wine, and brandy, ith a minor yield of ostrich feathers and tobacco. Fruits of all kinds ow readily, but they have only lately begun to be systematically cultivated. At the census of 1891 there were in the country 2¾ million cattle, 3 million sheep and goats, and 155,000 ostriches. In that year the yield of heat was 2¾ million bushels, and of mealies and other grain 4¼ million ushels. Tobacco was produced to the extent of 11,000,000 lbs., but

it has not yet reached a high level of excellence. The total yield wine was 6 million gallons, and of brandy 1½ million; the latter is, as rule, very inferior, and but little of the former recommends itself connoisseurs. The facts that Cape grapes have a very large proportion sugar and that the pressing has to be done in the hottest time of the yea militate against success in the production of high-class wines.

The mineral wealth of the country consists predominantly of diamond The seventy square miles at Kimberley, owned by the De Beer's Compan form the richest diamond mine in the world, with an output of some million carats per annum, representing a value of about $22,500,000. The are also valuable and interesting copper mines in Namaqualand near th mouth of the Orange River. A fair supply of serviceable coal is found the northward bend of the watershed. Of other metals and minerals the are samples enough to raise many hopes.

Flora.—South Africa is peculiarly rich in plant life, about one-sixth the genera of the whole world being found in it, and 142 natural orde are represented. European gardens have been enriched by many pela goniums, heaths, proteas, irises, lilies, and orchids native to the Cap There seem to be five different floral regions in Cape Colony, betwee which the watershed is the dominant dividing line. To the south of there are two, one in the south-west and south of the Colony, and or stretching almost from Port Elizabeth, through the Transkei and Nat into tropical Africa. On the other side of the watershed there are th Karroo region and the Kalahari region, both centrally situated, and a Con posite region towards the north-east.

The South-western region is the special home of what is known every where as *Flora Capensis*, including all the flowering plants enumerate above. The silver tree and, among orchids, the *Disa grandiflora* ar famous, and everlasting flowers form a notable export. The arum lil is the commonest wild flower. The aloe grows freely, and in the sout central forests many valuable timber trees are found, such as th yellow-wood and Cape mahogany. Oaks, pines, and many other tree have been introduced, and are easily cultivated, but the pine is almo the only tree that holds its own without help against the native plant The region has a remarkable affinity to south-western Australia, an many Australian trees, especially gums, have been successfully introduce

The Tropical region is characterised by dense bush and forest, such a the Addo bush in the Eastern Province. Here the whole country is greene and more luxuriant, and many trees have splendid foliage and show flowers. Euphorbias are common, and the palm begins to appear.

The Karroo region, being one of great dryness and subject to extreme of heat and cold, presents a general appearance of scattered shrubs o bare or stony soil. A species of acacia is the only tree in the whole regio and even that is not very abundant. Yet after a heavy rainfall the appea ance of the country improves with astonishing rapidity, and its occasiona

anescent beauty has to be seen to be believed. The plants, having to ruggle for existence, protect themselves from drought by succulence and thorniness from seekers after food.

The Composite region slopes to the north-east into the Orange River lony. It consists of vast treeless plains of dry moorland and heath, with assy patches here and there. It gets its name from the extraordinary edominance of *compositæ* in its flora.

The Kalahari region, in Bechuanaland, is principally a grass country, th isolated shrubs and trees.

Fauna.—The fauna of Cape Colony has been reduced by human ency to a mere remnant of what it formerly was, and it was never much fferentiated from that of the rest of the continent. The physical aspect the country accounts for the predominance of the ungulates among ammals: the elephant, the rhinoceros, the hippopotamus, the zebra, the raffe, the buffalo, and more than thirty kinds of antelope, once occupied e land, and were preyed upon by the lion, the leopard, and other hunting imals. Most of the native animals have now been driven to the north or led out; the quagga is quite extinct, and the "white" rhinoceros nearly . The birds are more remarkable for plumage than for song. Birds of ey are well represented. The stately secretary bird is strictly protected account of its services against snakes. The ostrich has been domesti-ted. Of snakes there are not many varieties, but they are fairly plentiful, d the very worst vipers (*e.g.*, the puff-adder) are among them. Scorpions d spiders abound, and the insect world is of great and often unpleasant terest. Thanks to the cold current along the Agulhas Bank, there is an cellent supply of fish, which is being more and more utilised every year. ured fish and tinned lobster are now articles of export.

Native Races.—As far as can be ascertained, the first inhabitants South Africa were the stunted, yellowish-brown Bushmen, who lived hunting only, a pursuit in which they trusted to poisoned arrows and to nning rather than to strength. Their language abounded in clicks and eep gutturals. They were monogamists, but their cohesive power as a eople was of the slightest. They were apparently proof against civilisa-on, and were it not that they have shown some signs of feeling for art in eir rude cave-paintings, one would be inclined to assign them to the lowest ade of humanity. They have dwindled away before the progress of the hite man, and now practically no longer exist as a people. The second rivals, the Hottentots, brought hairy sheep and a kind of cattle with em. The first Europeans found them living along the west coast and e Orange River. The race is nearly all mixed now, but in their original ate they were a flat-nosed, yellow people of medium height, pastoral but ot agricultural; with clicks in their language like the Bushman, but not arsh gutturals; using poisoned arrows too, but with assegais and knobkerries well. The present dominant native races of South Africa are of Bantu ock, and generally known as Kafirs. They have gradually made their way

southward within historical times. The e people—the Zulus, Basutos, Fingo Pondos and Bechuanas—are taller, stronger, and better formed than th earlier races, except on the we t of the Kalahari desert, where the Damara who are Bantu, are inferior to the Namaquas, who are Hottentots. They hav a high organisation of law, government, and discipline; they add agricu ture to their main occupation of keeping cattle; they use clubs, axes, an shields as well as assegais and kerries; and their languages are not onl free from clicks (unless these have been introduced but are governed by intricate grammatical rules an by principles of harmony of sound. The Bantu ar amenable to civilisation, and some individuals amon them have reached a high grade of education.

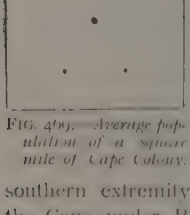

FIG. 469.—*Average population of a square mile of Cape Colony.*

Settlement. While the southward movement o unsettled races was still going on by land, a con petitive movement of Europeans began by sea. was almost a chance whether the Portuguese, the Dutch, or the English should first settle at th southern extremity of Africa. The Portuguese arrived first, roundin the Cape under Bartholomew Diaz in 1488, in the search for the sea route to India. Not foreseeing that it would not always be necessar to hug the shore on the voyage to the East, they thought they wer gaining the best chance of a monopoly by establishing themselves we to the north on the east coast. Some pioneer Englishmen claimed th Cape peninsula for the rule of James I., in the year 1620, but the Hom Government was not alive to the importance of such a base for trade, an the Dutch seized the neglected opportunity. They arrived in 1652, an under such wise rulers as Van Riebeek and Van der Stel the little nucle of a colony gradually pushed out its borders. In 1688 Huguenots, drive out of France by the Revocation of the Edict of Nantes, arrived i sufficient numbers and with sufficient energy to bring about a permanen change in the new country. This blend of French with Dutch has, in the course of two centuries, resulted in the formation of a perfectly distinct nationality which loves to call itself Afrikander, and it has developed out of the original Dutch language a colloquial dialect known as *Kaapsche Hollandsch*. The typical Afrikander —the South African Boer—is characterised by sturdy and courageous independence, a somewhat sensitive pride, a warm-hearted hospitality, and great attachment to old religions and domestic customs. He defends himself from the consequences of want of reserve by a qualit which is too genial to be called cunning, but which he himself cal "slimness."

FIG. 470.—*The Arm of the Colony of t Cape of Good Hop*

In 1806 the Cape of Good Hope passed into British hands. In 18 the arrival of English settlers laid the foundations of prosperity in t

astern division of the colony. Subsequently, various collisions with the domitable Afrikander spirit, such as that which arose from the mis-anagement of the Slave Emancipation Act, resulted in the great "trek" f emigrant Boers, which laid the foundations of the lately suppressed outh African Republics. In 1872 Responsible Government was con-erred on the Colony, and under this freedom the various races may in me settle into equilibrium, though the process has been impeded by the eelings once more aroused during the late war.

Railway System.- Since Cape Colony has no navigable rivers, and nals are out of the question, and even roads present serious difficulties, and nce the centres of population are far apart, the development of a good ystem of railway communication is of the very first importance. This is ill more evident in view of the fact that the Cape is largely dependent on s trade with the interior. From a purely topographical standpoint one ould expect that commerce would find its way to Rhodesia and the ransvaal through ports on the west or east coasts, approximately in the me latitudes as these districts; but the development of Africa has pro-eeded on such lines that hitherto the Cape has had the advantage of the orn channels of trade. One contributory cause is the unhealthiness of e tropical seaboard. The routes of the main railway lines have conse-uently been determined by the necessity of keeping these channels open; o that from Cape Town, from Port Elizabeth, and from East London lines n northwards, intercommunicating by branches near the coal district, nd then running in two parallel lines, one through the Orange River olony to the gold fields of the Transvaal, and one past the diamond fields f Griqualand West through Bechuanaland to Rhodesia and the Zambezi, ith a promise of early extension to Lake Tanganyika. Other lines bring ahamstown, the city of the settlers in the east, and also Aliwal North, to communication with the main lines; and a longer loop diverges so to join Port Elizabeth to Graaff-Reinet, "the Gem of the Karroo." Near ape Town, a side branch runs to Malmesbury, the wheat district; and in e north-west a small line serves the copper mines of Namaqualand ig. 437). Other lines, now being made, will connect the east with the est.

Much of the trade of the colony, and of the shipping at Cape Town, is, normal times, concerned with the transport of material to the Transvaal nd the export of gold from the mines.

Divisions and Towns.—The political divisions of Cape Colony are ot of much importance as such, but the broad distinction between East nd West is more than merely nominal. The stream of English immigra-on, finding the West already occupied, was diverted chiefly to the East, thus rgely altering the balance of nationalities. From time to time, indeed, ere has been much agitation in the East for separation, but the feeling common interest has up till now carried the day, and in spite of a tle natural jealousy the claim of Cape Town to remain the capital of the

whole country is everywhere admitted. In population, *Cape Town* ma tains its historical lead, being equal in this respect to the next three tov together, namely, Kimberley, Port Elizabeth and Grahamstown. Besi being the seat of governmen has the advantage of unriva residential charms in its subur its situation at the foot of Ta Mountain, flanked by the De Peak on one side and the L Mountain on the other, en ling it to rank among the m beautifully placed cities in world. Its population is v diversified; Dutch as well English is freely spoken, amo the European inhabitants, besides types of all the bl races there are some ten th sand "Malays," descendants of Asiatics originally imported as coolies.

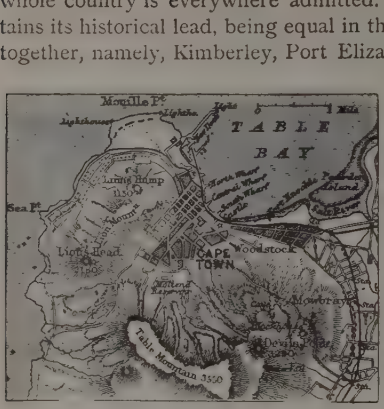

FIG. 471.—*The Site of Cape Town.*

Kimberley, founded as a mining camp in 1870, depends for its imp tance entirely on the diamond mines. Its site was originally of the m unpromising kind, and Kimberley fever had for a time an unpleas notoriety. But now the town is well built, efficiently drained, a abundantly supplied with water. Like Mafeking, further north, it s tained a protracted siege during the war. *Port Elizabeth* had likewise overcome the niggardliness of nature; its low hills were forme covered with scanty bush or bare sand, but water has been brou from a distant river, and now its parks and tree-lined streets pleasant to look upon. *Grahamstown*, once the chief town of w was called the Frontier, has lost much of its importance. It is neit a great centre of trade, nor has it mineral wealth in its vicinity. It however, beautifully situated in an amphitheatre of hills, and its clim is unrivalled.

The district of Kaffraria, between the Great Kei and Natal, may separately mentioned as being still in a transitional state of gove ment. Most of the land is in the hands of the natives, who are so what paternally ruled over by special magistrates. Pondoland, t south-eastern portion of this region, was not annexed to the colo until 1894.

Basutoland formed part of Cape Colony from 1871 until 1884. T natives, who, like many mountain-dwellers, are high-spirited above t average, revolted in 1879; and although the colonial government was a to maintain its authority, the subsequent friction was so great that t Imperial government found it best to turn the territory into a Cro Colony. Basutoland is sometimes called the Switzerland of So **Africa.**

STATISTICS OF CAPE COLONY.

	1875.	1891.	1898.
Area of Cape Colony, square miles	191,416	221,311	276,947

Population :—	Europeans.	Blacks.	Total.
Census of 1875 (whole Colony as then constituted)	236,783	484,201	720,984
Census of 1891 { Colony as in 1875	336,938	619,547	956,485
Census of 1891 { Whole Colony	376,987	1,150,237	1,527,224

ANNUAL TRADE (*in pounds sterling*).

	1873–77.	1883–87.	1893–97.
Imports	5,400,000	5,100,000	14,400,000
Exports	5,400,000	7,000,000	16,000,000
Export of Diamonds[1]	1,550,000	3,160,000	4,140,000
Export of Gold[2]	25,000	33,000	7,925,000
Other Exports[3]	3,825,000	3,807,000	3,935,000

DESTINATION OF ONE YEAR'S IMPORTS.

Merchandise entered for consumption in 1897	Total.	For Cape Colony.	S.A. Republic.	Rhodesia and B. Bechuanaland.	Orange Free State and Basutoland.
	£16,095,000	£9,870,000	£4,600,000	£570,000	£1,055,000

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II.—NATAL

BY THE RIGHT HON. JAMES BRYCE, O.M., F.R.S.

Position and Divisions.—The British colony of Natal lies on the ast of the Indian Ocean, between Cape Colony and Basutoland on the est and the Portuguese territories on the north-east, being bounded on north by the Orange River and Transvaal Colonies. Apart from an a lately detached from the latter, it consists of three districts—Natal oper, Zululand, and Tongaland, which it is more convenient to describe parately, as their economic and social conditions differ.

Natal Proper.—Natal proper is, with the exception of the level lp along the coast, only a few miles wide, a hilly country, nearly of which is over 2,000 feet above sea-level, while some of the untains attain 7,000 feet. On the frontier of Basutoland a few nts are still loftier, approaching 11,000 feet. The ground rises tty uniformly from the coast northward, and along the line of the ange River Colony it touches the central watershed of South Africa, ich is here the outer or south-eastward rim of the great central teau. Except on the Basuto frontier the mountains are usually rounded

[1] The staple export of the Colony. [2] In transit from the Transvaal.
[3] Illustrating the stationary condition of all exports of the Colony except gold and diamonds.

in their outlines, and covered with grass. The valleys are often wide a open, but there is very little level ground, and no extensive plains, such are met with on the great inland plateau, or along the shore of the oce further north. The climate is damp along the coast, but becomes co stantly drier as one goes inland; for nearly the whole of the rainfall com from the south-east, and most of it is received by the hills towards t ocean. The rainfall, which is 42 inches at Durban, on the sea (Fig. 46 diminishes to 30 inches in the highlands of the north close to the Tra vaal border. The heat of the coast strip, moderated by the south-ea trade-wind which blows steadily for most of the year, is somewhat great than the latitude would explain, and seems to be largely due to t influence of the warm Moçambique current. The climate is on t whole a very healthy one, for its dryness prevents the heat from bei enervating to Europeans, and the winters are cool; indeed in the northe highlands they are sometimes severe, and heavy snow-falls are n uncommon.

Resources of Natal.—The fauna of Natal differs little from that the eastern parts of Cape Colony. The flora resembles that of the easte region of Cape Colony rather than that of the more lofty and arid Tra vaal and Orange River Colonies. It is only on the coast strip that vegetati is luxuriant, and such crops as sugar, rice, bananas, and pine-apples c be grown. But the rainfall is sufficient to give herbage on the mou tains, so that the proportion of arid desert land is small. The valle especially in the southern and western districts, are often well woode while in the northern highlands few trees are seen, except stunted acaci and willows. Probably no part of South Africa has so large a proporti of its surface available either for tillage or for pasture. Nearly all of it now in pasture, and the chief occupation is the rearing of cattle and shee This is owing partly to the thinness of the white population, partly to t fact that in many of the inland valleys costly irrigation works a desirable, if not absolutely necessary as a security against the drough Tea is grown on the hills towards the coast, while cereals, especia maize, and tobacco do well in the inner valleys.

Gold has been found, but the reefs are little worked, and silver, copp and lead also exist. The mineral of most importance is coal, of whi there are extensive beds. It is largely worked round the villages of *Ne castle* and *Dundee*. In point of quality it is inferior to the best Europe or American coal, but equal to any that has been found in Africa. Co siderable deposits of iron exist close by, and promise a successful develo ment of iron industries whenever it becomes cheaper to make iron goo than to import them. There are at present no manufacturing industri of any importance, and no places large enough to be called tow except *Durban*, practically the only seaport, and *Pietermaritzburg*, t capital.

People of Natal.—Of the white inhabitants fully two-thirds are

itish, and less than one-third of Dutch origin. Nearly all can speak nglish, but Dutch is used to some extent, especially in the North. The tive Kafirs are mostly heathen, live under their own headmen, and pre- ve most of their native customs. They are now usually quiet and aceable. Few can speak any language but their own, the Zulu tongue ing that of the majority. Indians, who are largely ohammedans, have recently immigrated either from nzibar and other ports on the East African coast or om the western provinces of India. Many are gar- ners, cultivating fruit farms on the south coast; iers are indentured coolies, at work on the sugar ntations for a term of years, and others have come mechanics or small shopkeepers in the towns. law has been passed for the exclusion of all immi- ants unable to write a letter in European characters. ere is little or no intermarriage between the black and white races, o, however, live quietly together.

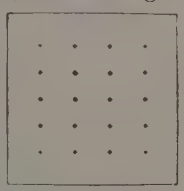

FIG. 472.—*Average population of a square mile of Natal.*

History and Government.—Natal was discovered by Vasco da ma on his voyage to India in 1497, and received its name because it as first seen on Christmas Day. The Portuguese, however, did not aim it, and it remained untouched by Europeans till a few Englishmen tablished themselves at the harbour then called Port Natal (now Durban) out 1824. The British Government was at that time unwilling to acquire w African territory which might involve them in fresh wars. The rocious Chaka, king of the Zulus, had shortly before ravaged the untry, slaughtered a large part of the native inhabitants, and left most it vacant. This fact, together with its reported advantages of soil and mate, came to the knowledge of the Boer emigrants who had quitted pe Colony (in disgust at the proceedings of the British Government) in 36, and led a large body of them to cross (in 1838) the passes from the eat interior plateau and occupy the valleys in the centre of Natal. They feated the Zulus and set up a republic—which they called Natalia, and ilt the town of Pietermaritzburg. The British Government, however, llowing the advice of the Governor of the Cape, conceived that no dependent State ought to be suffered to establish itself on the coast, and cordingly dispatched to Port Natal a force, which, after a short war, mpelled the Boer emigrants to leave or submit. At first a dependency Cape Colony, Natal was created a separate colony in 1856. Meanwhile mense numbers of Kafirs flocked in, especially from the north and st, and though the number of whites increased steadily, the proportion Kafirs to whites has continued to be about ten to one. Zululand was nquered in a war with the native king Cetewayo in 1879, and in 1887 ter a part of it had been occupied by freebooters from the Transvaal, d detached from the rest of the country) was declared to be British rritory. In 1893 responsible government was granted to the colony, and

in 1896 Zululand and Tongaland were incorporated with it. The northe part of the colony was the scene of important military operations duri the earlier part of the Boer War (1899–1902), the chief feature of whi was the defence and ultimate relief of Ladysmith. The government is, in the other self-governing British colonies, in the hands of a Govern sent from home (whose functions resemble those of a constitutional kin and of a legislature with a Cabinet responsible to it. There are t Chambers—a Legislative Council of eleven, and an Assembly of thir seven members; the former appointed by the Govern for ten years, the latter elected for four years by t people on a franchise which is (for whites) almo universal. All Kafirs and Indians are unenfranchised

FIG. 473.—*The Badge of Natal.*

The customs tariff is lower as regards most artic of import than that of the South African Customs Unio which Natal has not entered. The chief exports are wo sugar, hides and maize. The railway lines (600 mi in length) belong to the State, and run through fr Durban to the Transvaal and Orange River Colonies. Elementary educati is provided by the State for all white people, and by the mission schools f a certain, though relatively small, part of the blacks. There is no universi

Zululand.—Zululand is divided by the Tugela River from the rest Natal, of which it now legally forms a part. The population is nearly Kafir. Except a plain along the coast, which is hot and generally unhealth it is a high country, though hilly rather than mountainous, with no po reaching 5,000 feet, and very little land above 3,000. The higher pa are grass-covered, and furnish some of the best pasture-land in So Africa. Gold has been found, and the reefs are believed to be v promising, but neither they nor the other mineral deposits thought exist (including coal, iron and silver) have as yet been carefully examin The natives live under their tribal chiefs, preserving their primitive usag and though brave and warlike, they have of late years been quiet.

Tongaland.—Tongaland is a strip of country mostly flat, and many places marshy and unhealthy (since the heat is great), which stretch along the coast northward from Zululand to the frontier of the Portugu territories, between Swaziland and the Indian Ocean. It consists several petty principalities under native chiefs, who have at various tin within the last few years (the last of them in 1894) been brought un British protection. The Tongas are a branch of the Bantu family, w speak a language quite different from that of their neighbours the Zu and Swazis (the latter being near of kin to the Zulus). They are l martial than the Zulus, but generally similar in their customs. They a nearly all heathen, and no whites, except a very few missionaries, l among them. So far as is known their country has no great econon value, and it has no deep-water port. The people have been studied m in the adjoining parts of Portuguese East Africa, where the Ba-Ronga a a Tongan tribe.

STATISTICS OF NATAL.

	1879.	1891.*
Area of Natal, square miles (estimate)	21,150 ..	32,500
Population	361,587 ..	724,283
White population	22,654 ..	47,888
Density of population per square mile	17 ..	23
Population of Durban	17,127 (1884)	25,512
" Pietermaritzburg	14,231 "	17,500

ANNUAL TRADE (*in pounds sterling*).

	1871–75.	1881–85.	1891–95.
Imports	940,000 ..	1,900,000 ..	2,920,000
Exports	815,000 ..	900,000 ..	1,323,000

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III.—SOUTHERN RHODESIA AND BECHUANALAND

By F. C. Selous.

British South Africa.—The British possessions on the great table
d of South Africa, outside the two self-governing colonies of the Cape
Good Hope and Natal, and the recently annexed Boer colonies, extend
rthward to the boundaries of the Congo State and the southern shore of
ke Tanganyika, with the Transvaal, Portuguese East Africa and British
ntral Africa on the east, and German South-West Africa and Portuguese
est Africa on the west. The territory may be divided into Southern and
rthern Rhodesia, separated by the Zambezi, in the east and north, both
der the charge of the British South Africa Company; and the Bechuana-
d Protectorate in the south-west. Northern Rhodesia has been referred
under British Central Africa.

SOUTHERN RHODESIA

Position and Boundaries.—Southern Rhodesia lies immediately
the north of the Transvaal Colony, from which it is separated by
e Limpopo or Crocodile River, which forms its southern boundary.
rthwards it extends to the Zambezi. Its eastern boundary with
rtuguese East Africa was defined by the Anglo-Portuguese Agree-
ent of June 11, 1891, as the edge of the Manika plateau. To the west it
bounded by a line running south and east from the junction of the
obi with the Zambezi, to the headwaters of the Shashi, and thence along
e course of that river to the Limpopo; practically the old line of
marcation between the territories of Khama and Lo Bengula. It lies
tirely within the tropics, extending in latitude from 22° S. to 16° S. and
longitude from 26° E. to 33° E.

* Includes Zululand.

Surface.—Through this territory there runs an elevated region whi extends from the source of the Shashi on the west, north-eastwards to t source of the Hanyani or Manyami River, and thence trends south-eastwar to the sources of the Odyi and Pungwe. Along this elevated backbo runs the watershed between the Zambezi and Limpopo drainage areas, the western and central portions of the territory, and between the Zambe and Sabi further east. The whole country along the watershed excee 4,000 feet above sea-level, rising gradually from about 4,000 feet at t source of the Shashi in the west towards the north-east, where it reach 5,400 feet at the source of the Hanyani River. In the Inyanga platea where the Ruenya, Odyi, and Pungwe rivers take their rise, it culminat in an altitude of over 7,000 feet, and sinks abruptly to the east. T surface of the elevated belt consists of open undulating grassy downs. the north and west they slope gradually towards the Zambezi and t northern Kalahari desert, little or no broken country being met with ne the watershed, but the open grass-land gradually gives place to continuo forest on the lower slopes. On all other sides the high plateaux are bound by a belt of broken country which varies in breadth from 20 to 50 mile In the south-west (Matabeleland) this belt may be described as hilly, a there is a fall of some 700 or 800 feet in a distance of from 20 to 30 mile but in the east (Mashunaland) the descent to the low plain which bord the east coast, and extend up the valley of the Zambezi, becomes abru and of a mountainous appearance. From the Inyanga plateau to the low valley of the Pungwe there is a fall of over 6,000 feet in less than 1 miles.

Hydrography.—The highest portions of the plateau are granite, but the slopes to the north, north-west, south, and south-west, ranges of hi of different formation run through the granite, and amongst them numero gold-bearing quartz-reefs occur. On the value of these reefs the spee development of the country must largely depend. The whole of the hi plateau is well watered, the more easterly portions being intersected every direction by innumerable small streams, which are fed from sprin welling out from the head of almost every valley on the open down Most of these never run dry even in the driest seasons, being probab supplied from underground reservoirs in the granite, in which gre quantities of water are yearly stored during the rains. Anomalous as may seem, the highest portions of the plateaux of Southern Rhodesia a thus the best watered, though they are not dominated by mountain range The innumerable small streams of the highest part of the downs gradual collect into brooks, and these converge to the main rivers which drain t country, and finally reach the Zambezi, the Limpopo or the Sabi. Follo ing the watershed across the open downs which lie between the sources the Hanyani and the Umniati rivers, where the altitude is between 5,0 and 6,000 feet, a little stream of running water will be met with at near every mile. But crossing from the Hanyani to the Umniati, some 2,0

t lower down the slope, all these are found to be collected into a few all rivers, and stretches of country occur perhaps 20 miles wide hout a single stream. Down still farther in the Zambezi valley not a gle stream of water flows into the river between the mouth of the nyani and that of the Umniati (there called the Sanyati), a distance of haps 150 miles, the intervening country being entirely waterless during dry season.

The Zambezi, which divides Southern Rhodesia from British Central ica, is one of the largest rivers in Africa. It is navigable by steamers ight draught from its mouth for 300 miles to the Kuroa Basa rapids above e; whilst a steamer placed on the river above those rapids might reach mouth of the Gwai, 600 miles farther, if it could make its way against strong current which rushes through the narrow defile of Kariba. m the mouth of the Gwai onwards uccession of rapids and two large terfalls make the Zambezi unnavi- le for any long distance without a ak. The fall known as *Mosi-a-tunya* oke-sounding) by the natives, which s discovered by Dr. Livingstone in 1, and named by him the Victoria lls, is second to none in the world in gnificence, for although I will not that it is finer than Niagara, it yet passes that stupendous cataract in ne respects, and as a whole appeals te as powerfully to the imagination. e magnitude of these falls will be derstood from the bald statement t they are 2,000 yards in width and feet in perpendicular height. The t volume of water falls, not into an en gorge like Niagara, but into a narrow rift, whence the escape is by a l narrower zigzag ravine through a mass of hard rock. The falls are out 225 miles distant from Bulawayo, in a direct line, and the railway ich crosses the river just below the falls was opened in 1905. The falls of nye on the Upper Zambezi, though not to be compared to the Victoria lls, are yet very beautiful. They are also in British territory, being uated on that section of the Zambezi which flows through Northern odesia, the central division of British Central Africa.

FIG. 474.—*The Victoria Falls on the Zambezi.*

Climate and Resources.—The climatic conditions of a territory ich includes the low-lying valleys of the Zambezi and the Limpopo, as ll as the high open plateaux of Matabeleland and Mashunaland, are turally very diverse. In the low parts of the country the heat is often y oppressive; malarial fever of a severe type is prevalent at certain

times of the year, and such districts are not suited for European coloni tion. But the climate of the high plateaux, above the fever limit, is ve fine and bracing, and the whole of Southern Rhodesia which lies abo 4,000 feet seems destined soon to be settled by Europeans, whilst the a may possibly be extended in the couse of time to a somewhat lower lev as the cultivation and drainage of the land proceed. On the high platea the heat even in the hottest weather is not excessive, the shade temperat seldom exceeding 90° in the higher parts of eastern Mashunaland ; western Matabeleland, where the heat is greater, 100° F. in the shade very exceptional, and at an altitude of 5,000 feet these temperatures not very trying. On the plateau the nights are cool the whole year roun during the winter months of May, June, July and August, they ev become cold and frosty. At that season the days are always bright a clear, pleasantly warm but not too hot. During the months of Novemb December, January, February and March, heavy rains may be expect with thunderstorms during October and April, and occasionally a li light rain during the winter months. The season of continuous r sometimes sets in early in November, at other times not until late December, and as a rule the heaviest rains take place after Christm The rainfall is heavier in the east than in the west. The average probably about 40 inches in the former district and 25 in the latter ; observations are not yet sufficiently numerous to enable one to spe definitely. In the rainy season which ended in April, 1891, a rainfall 53 inches was recorded in Salisbury, Mashunaland, but the following y the rainfall was under 25 inches.

Agricultural Prospects.—It is clear that the most valuable portio of Rhodesia, those best fitted for agriculture and pasturage, are the distri lying on the broad back of the plateau along which the watershed ru With few exceptions the lower one descends towards the valleys of Zambezi and the Limpopo, the drier and more desolate the coun becomes. For stock farming no portion of South Africa is better suit than the high plateaux of Rhodesia, in evidence of which when the for of the British South Africa Company entered Matabeleland in 1893, the were over 200,000 head of horned cattle in that territory alone. Furth eastward, too, cattle do equally well. A small flock of merino sheep w introduced into the country a few years ago and has thriven well, and it quite possible that in the not distant future sheep farming may become profitable as in any other part of South Africa. All European vegetab and many kinds of fruit do well ; in fact, if a supply of water is assur either as rain or by irrigation during the dry season, almost everythi required by civilised man can be grown. Excellent crops of wheat a oats may be raised all over Rhodesia during the dry season by irrigati but if sown during the rainy season they are liable to suffer from rust.

Big Game.—Elephants, once very plentiful throughout the grea portion of Rhodesia, had become so much reduced in numbers by consta

ting and the indiscriminate slaughter of females and calves as well as es, by hordes of natives armed with good guns and rifles, and a few r and British hunters, that the export of ivory from Matabeleland in thing but very small quantities had practically ceased before the ntry was taken possession of by the white men, in 1893. There are still, vever, a good many elephants wandering about over the vast unin- ited tracts of country lying between the high plateaux of Matabeleland Mashunaland and the Zambezi. As the natives of the country have v been disarmed, or if possessed of firearms, have no means of obtain- ammunition, and as the elephants are now so scattered and so wild t it would not pay a European to hunt them, and as, moreover, it is now enal offence to shoot one, it may be hoped that these fine animals l again gradually increase in numbers in those districts of Rhodesia ich are unfitted for European settlement.

All other classes of game, especially giraffes and many species of elopes, which have been spared by the recent visitation of rinderpest, too, owing to the fact that the natives have been disarmed, and in e of the increase of the European population, undoubtedly on the rease. Buffaloes, elands and koodoos have suffered so seriously from lerpest that it is possible that they may become extinct. Lions are numerous, and commit serious depredations upon the settlers' live k. They are therefore destroyed whenever it is possible to do so.

History.—But little is known of the ancient history of Southern desia. Rock paintings of a character identical with those found in the ntain caves of Cape Colony and the Orange Free State seem to show the country was once inhabited by Bushmen. This pygmy race must, vever, have been destroyed, or driven into the western deserts at a very ote period. Remarkable ruins of stone-built fortifications and temples, ously carved and containing evidence that the builders worked in gold, scattered over the plateau. They point to the early possession of the ntry by a civilised people, possibly the Sabæans from Arabia, and e believe that Southern Rhodesia contained the Ophir of Solomon. Bantu races spread over the whole land, and, though divided into eral sections, all the various clans spoke dialects of one language. ly in the nineteenth century Rhodesia was invaded by two Zulu tribes, Abazwang indaba and the Abagaza, who, after devastating large areas of ntry, fought with one another, and the Abazwang indaba being defeated ssed the Zambezi and now live on the plateau to the west of Lake sa under the name of Angoni, while the Abagaza settled in the hlands near the Sabi river. In 1837 another Zulu clan, under the chief ziligazi, left the Transvaal and settled in the west of Rhodesia, now wn as Matabeleland. For over fifty years they preyed upon the rounding peoples generically known as Mashunas, and depopulated rmous areas of country. In 1890 the Rhodes pioneer expedition occupied east of the country, which had suffered greatly from the Matabele.

Towns and Railways.—The township of *Salisbury* was establish in 1890, and subsequently townships were laid out at *Victoria*, *Umtali* a *Melsetter*. Salisbury is most easily reached from the east coast by railw through the excellent seaport of Beira in Portuguese territory. As a result the war of 1893 Matabeleland was definitely added to the territory of British South Africa Company. Early in 1894 the European township *Bulawayo* was established, some three miles distant from the old nat kraal, near the top of the plateau close to the watershed. This town, wh has already become an important place, has been connected with Cape To (a distance of 1,600 miles) and with Salisbury. Lines have also been c structed from Bulawayo to the Victoria Falls *viâ* the Wankie coal-fie and to the Gwanda gold-fields; and from Gwelo (one of the most imp tant of the more recent townships) to the Selukwe district; while anot will shortly be made from Salisbury to the Mazoe district in the nor-h-eas

THE BECHUANALAND PROTECTORATE

Position and Surface.—North of British Bechuanaland, wh is now under the government of Cape Colony, lies the Bechuanala Protectorate, containing the territories of several native chiefs, of wh the most important are, Batheon, Sebele (the son of Sechele), Linsch and Khama. The southern portion of the Protectorate lies to north of Bechuanaland proper, and extends west of the Transv for an indefinite distance into the Kalahari desert. In this part of territory the natives live in large villages, most of which are situa on the headwaters of the Notwani and its tributaries flowing to Limpopo. Before the terrible plague of rinderpest passed throu the country in 1896 these people possessed large herds of cattle whi though spread over the country during the rainy season, were all collec along the rivers, round wells, or wherever there was permanent wa during the long dry season. The great waterless wastes of the Kalah desert which lie to the west of the settlements are used as hunting grou and are only permanently inhabited by a few scattered families of a peo of Bantu origin, known as Bakalahari (*i.e.*, they of the desert), who live n the few permanent wells, and collect skins and ostrich feathers for th Bechuana masters.

The Bechuanaland Protectorate lies mainly on the western slope of high plateaux of South Africa, and almost the whole of it has an altit of about 3,500 feet. It is for the most part dry and arid, but good crop maize, native corn (*Holcus sorghum*) and pumpkins are grown during rainy seasons by the Bechuanas. Cattle, sheep and goats thrive well over the country wherever there is water, as the pasturage is everywh plentiful, and, except along the courses of the rivers, where fever is rife dur the rainy season, the country is healthy for Europeans.

Khama's Country.—By far the largest portion of the Protectorat ruled over by the well-known and enlightened chief Khama, whose la

nd from latitude 23° 30′ S. in the south, where they march with Sebele's ntry, to the junction of the Chobi with the Zambezi in latitude 17° 50′ S. the east they are bounded by the Transvaal and Southern Rhodesia, lst to the west they extend in the southern portion for an indefinite ance into the Kalahari desert, and further north are divided by an efined line from the country of Moremi, a chief whose principal settle- nt is on the Okovango River to the north of the desolate Lake Ngami. h Khama and Moremi claim jurisdiction over the country lying along the thern bank of the Chobi to the east of Linyanti; although this strip of ntry has been assigned to Germany—by an Anglo-German convention nout reference to either chief. Almost the whole of Khama's country very sparsely peopled or entirely without permanent inhabitants; vast majority of his tribe live together in the town of *Palapye*, the gest native town in South Africa, and the remainder are occupied in ding the great herds of cattle which graze along the banks of the npopo and other rivers. Before the visitation of rinderpest Khama and people were very rich in cattle and also possessed large herds of tailed sheep, and goats of a fine, large breed.

North-Western District.—The great desert wastes lying between Botletlie River and Southern Rhodesia, and extending to the Chobi the north, are uninhabited save by a few families of half-starved sarwa Bushmen, wandering savages, who build no huts, do not till ground, nor keep any kind of domestic animals save jackal-like dogs, live on roots and honey, frogs and tortoises, with an occasional st when they succeed in killing a large animal in a pitfall or with a soned arrow. The Bechuana tribes inhabiting the Protectorate are a nch of the great Bantu family who people South Africa, to the east of Kalahari desert. South of the Zambezi the Bantu race may be divided guistically into three branches, viz., that formed by the tribes speaking u and cognate dialects, those which speak Chiswina or dialects of that guage, and those which speak Sechuana or Sasuto. All these languages dialects have been derived from one parent language probably at no y distant period in the past, as they are still all nearly allied.

A strip of country along the Transvaal frontier is reserved to the tish South African Company, and along it the railway to Bulawayo which v runs beyond the Zambezi is carried.

STATISTICS (*estimates*).

	Area square miles.	Population.
Southern Rhodesia	141,000 ..	450,000
Bechuanaland Protectorate	213,000 ..	200,000

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IV.—THE ORANGE RIVER COLONY

By the Right Hon. James Bryce, O.M., F.R.S.

Position and Surface.—The Orange River Colony is part of t great plateau of South Africa, and is not marked off by any natu boundaries of the first rank from the territories which border it on t north, west, and south. On the north and north-west it is divided fr the Transvaal by the Vaal River, a stream of small volume except af rains, and from Cape Colony on the south by the Orange, but the physi character of the country on both sides of these rivers is similar. The surfa is mostly level or gently undulating, with some ridges of hills and ma isolated and frequently flat-topped eminences (*kopjes*), often bold in outli but seldom rising more than 500 to 700 feet above the surrounding count The whole plateau, however, has an elevation of from 4,000 to 5,000 f above the sea. The scenery, though in some places pleasing, cannot called fine except along the river Caledon, where the views of the lof Maluti Mountains in Basutoland are often very striking. During a immediately after the rains of early summer (November and Decembe the wide plains, dressed in fresh verdure, have an expansive beauty their own under the brilliant air, but for the rest of the year they are ar and monotonous, and the landscape is somewhat dreary. The only co siderable rivers are the Vaal on the north-east, the Caledon on the sout east, and the Orange, which forms the south-west boundary and carri the water of the other two to the Atlantic. They are not navigable.

Climate, Flora and Fauna.—The climate is the normal one of t plateau, practically rainless during eight months of the year, with freque heavy showers during the summer months of November, Decembe January and February, but a low annual rainfall. No part of South Afri is more healthy and bracing. Although snow seldom falls and soon di appears when it has fallen, the winter cold is severe in the higher ar more exposed spots. In no part of South Africa is the want of woo more felt; there are no forests, and few trees are found except thorn acacias on the open plains and willows along the watercourses. The wi animals, which were once very common, have now become comparative rare; but large herds of the beautiful springbok are still met with.

Resources.—The mineral resources of the Colony, so far as the have been explored, are much inferior to those of the Transvaal. Ver little gold has been found, but there is one important diamond mine a Jagersfontein, in the western part of the Colony near the Vaal River. Co is found in the Kronstad and Heilbron districts in the north, but the co deposits have not yet proved to be large in extent nor of high qualit Tillage is at present practically confined to the strip of fertile lan which lies along the right bank of the Caledon between Ficksbur and Wepener. This is one of the best agricultural districts in Sout

rica, producing heavy crops of cereals without irrigation, for the rain- l there is comparatively good, as the mountains of Basutoland are not distant. Other places might be cultivated if a larger neighbouring rket encouraged the construction of irrigation works, and if capital re available for the purpose. The main reliance of the inhabitants is cattle-breeding, and farms are large, for the pasture, though thin in e hilly districts, is good, and (save in exceptionally dry seasons) water n be found almost everywhere. Since the great outbreak of cattle ague in 1895 and the war of 1899–1902 the number of cattle has been eatly reduced. There are no manufactures.

History.—When the country which is now the Orange River Colony as first explored (1800–1830) by hunters, and afterwards by mission- es and wandering traders from Cape Colony, much of it was inhabited, and large parts were in the hands of nomad Bushmen. ere were considerable tribes of Kafirs of the great Bantu family, some which had fled thither to escape the attacks of the Zulus, while some v Griquas, a mixed race of Dutch and Hottentot blood who lived chiefly hunting, had moved eastward from Cape Colony and dwelt in the reme west near the Orange river. About 1830 the cattle farmers in e outer part of the Colony began to drive their herds at certain seasons oss the Orange river for change of pasture, and in 1836 the "Great ek," an emigration *en masse* of some thousands of Dutch farmers from e Colony, brought a considerable white population for the first time into ese regions. These emigrants desired to escape from the sovereignty of e British Crown, and were for some years permitted to live in practical dependence. They did not, however, either eject the Kafir tribes or main- n any regular government among themselves ; and their frequent quarrels th the natives, inducing trouble on the borders of the Colony, ultimately duced the British Government, which had always continued to claim eir allegiance, to move forward. In 1846 a British fort was erected and garrison placed at Bloemfontein, and in 1848 the territory between the ange and Vaal rivers was annexed under the name of the Orange River vereignty. The Dutch settlers, aided by those who had settled north- st of the Vaal, rose in arms and were defeated by Governor Sir Harry ith, but troubles presently broke out with the Basuto Kafirs living to e south of the Sovereignty, and in 1854 the British Government (which d two years previously renounced its authority over the emigrant Boers o lived beyond the Vaal) withdrew from the Sovereignty, considering at it involved more expenditure and trouble than it was worth. The vereignty was recognised as independent, under the name Orange Free ate, on undertaking never to permit slavery or the slave trade. In 1899 ar broke out between the Free State (allied with the Transvaal) and the nited Kingdom, and, although Bloemfontein was occupied by the British ny early in 1900, was prolonged for two years more, the supremacy of e British Crown being finally recognised by the peace of May 31, 1902.

During the existence of the Orange Free State the government w vested in a popular assembly called the Volksraad, and in a Preside assisted by an Executive Council. This system worked smoothly, a the history of the Free State from 1854 to 1899 was, on the whole, fr from trouble or excitement. The most importa events were the successive wars with the Bast Kafirs, in one of which the fertile territory alo the north bank of the Caledon river was co quered from that tribe, and the dispute with t British Government over the district in which t town of Kimberley now stands, where diamon were discovered in 1869. Although sympathisi with their kinsfolk in the Transvaal Republic, t people of the Orange Free State never assisted them against the Briti power until the war of 1899–1902. Before the war, about four-fifths the white population were of Dutch origin, and the Dutch language— rather a South African dialect of it—was generally spoken, except *Bloemfontein*, the capital, and the only place large enough to deserve t name of a town, where nearly everybody knew something of both Dut and English. In 1890 there were about 130,000 natives, some living in tribal state and cultivating the land or keeping cattle, but the majori in the employment of the whites. Nearly all the whites and a great part of the Kafirs belonged to the Dutch Reformed Church, which received a grant from the public treasury. One line of railway, forming part of the trunk line which runs from Cape Town to Johannesburg and Pretoria, passes through the colony from end to end, and several branches have been constructed, while others are either under construction or contemplated, including one to join the main line with the Natal system *viâ* Harrismith. The colony was granted responsible government in 1907 with a constitution similar to that of t Transvaal.

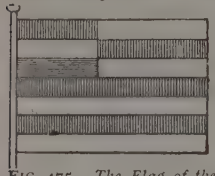


FIG. 475.—*The Flag of the former Orange Free State.*

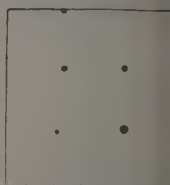


FIG. 476.—*Average po ulation of a s mile of the Oran River Colony.*

STATISTICS.

	1880.			1890.
Area of Orange Free State, square miles (estimate) ..	48,326	..	..	48,326
Population	133,518	..	..	207,503
White Population	61,022	..	..	77,716
Density of population per square mile	3	..	..	4
Population of Bloemfontein	2,567	..	..	3,459

ANNUAL TRADE (*in pounds sterling*) 1891–95.

Imports	1,000,000
Exports	1,500,000

V.—THE TRANSVAAL COLONY

By the Right Hon. James Bryce, O.M., F.R.S.

Position and Surface.—The Transvaal Colony, formerly the South rican Republic, and now (since 1894) including the dependent native ritory of Swaziland, is bounded on the east by Portuguese East Africa d the British territories of Tongaland and Zululand, on the south by tal and the Orange River Colony, on the west by Cape Colony and the itish Bechuanaland Protectorate, on the north by territories of the British uth Africa Company. About one-sixth of its area lies within the tropics. ysically it consists of two regions. The larger part belongs to the great uth African plateau, and has an average altitude of from 4,000 to 5,500 et, some valleys sinking to 3,000, and a few eminences rising to 6,000 et. Like the rest of that great plateau, this part is bare and arid, covered th thin grass, and here and there with a still scantier growth of thorny es and shrubs. It goes by the name of the High or Grass Veldt. About e-third of the area, forming the northern portions of the country and a ng but comparatively narrow strip along the eastern border are much ver, from 1,000 to 3,000 feet above sea-level, and much hotter; they are most places well wooded, and are called the Bush Veldt. The most nsiderable range of mountains runs nearly north and south, forming the stern edge of the great plateau to which the High Veldt belongs. is range is a part of the great chain which bears the name of Drakens-rg or Quathlamba, and some of its summits reach 7,000 feet. The aller range of the Magaliesberg runs westward from Pretoria, dividing e basin of the Vaal river from that of the Limpopo. The only large ers are the Vaal, which forms the southern boundary of the Transvaal, e Olifants (Elephant's) river, and the Limpopo, which rises near Pre-ia, flows first north-westward to the Bechuanaland frontier, then turns rth and east, and forms for a long distance the northern boundary. ne of these is navigable.

Climate.—The physical aspects, climate, fauna and flora of the gh Veldt region are those typical of the South African Plateau. The nfall is largest on the eastern mountain range, exceeding there 30 inches the year, while on the western plains it is perhaps only 15 inches. all the rain falls during the summer months, and nearly all of it in ecember, January, and February, the surface is very dry and parched ring the rest of the year. The summer heat is intense, although tempered strong south-easterly breezes; while the winter cold is severe only in a w of the highest districts, such as the ridge of the Witwatersrand. There however, little frost and practically no snow, because of the dryness of e cold weather. The High Veldt is as a rule healthy, owing to its dry-ss; but malarial fevers occur in the lower grounds on the banks of streams. n the other hand the Bush Veldt region, being comparatively low and

in many places marshy, covered with long grass and often with thick woo
is very feverish, particularly in the Limpopo valley and along the Portugue
frontier. In these woody regions the largest number of wild anima
remain. The elephant and rhinoceros, together with the buffalo and ma
of the large antelopes, may still be killed in the north-eastern districts ; t
lion, though growing rarer, is not yet extinct, and the leopard is st
abundant. All the larger and some even of the smaller rivers are full
crocodiles, and the hippopotamus is found in the Limpopo.

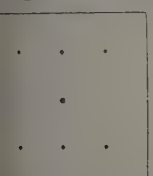
Agricultural Resources.—Many parts of the lower grounds are w
suited for tillage, having a rich soil and a sufficient rainfall, but owing to t
sparseness of the population and the prevalence of fever, only a trifli
area is as yet under the plough. Cotton and sugar might be raised, as w
as maize, which is at present practically the only crop. Artificial irrigati
is necessary in most parts of the dry High Veldt, where the tillage as yet
mostly of the market-gardening kind along the streams. Excellent tobac
is raised, which might be made an important article of export. All t
surface, except those lower parts of the Bush Veldt which are infested
the tsetse-fly, and some parts of the High Veldt where the soil is exce
tionally poor and stony, is fit for live stock ; and the keeping of cattle
sheep was, until the discovery of gold, practically the only occupation
the people. The grass is in most places so thin that the pastoral farms a
very large, and it is the custom of the farmers to drive their herds in wint
to the lower grounds of the Bush Veldt, and in summer to the High Vel
where good fresh grass springs up after the rains of November and Dece
ber. The cattle were enormously reduced in number by the plague whi
appeared in 1896 ; but the country is capable of supporting a much larg
number than it has ever yet had.

Mineral Resources.—In minerals the Transvaal is, so far as we
know, far richer than any other part of South Africa. It has large depos
of coal, though not of the best quality ; the output for 1897 was returned
1,667,000 tons. Associated with the coal there are extensive beds containi
iron. Copper, silver and lead have also been found, but are little worke
There are three districts in which diamond-mines are worked, though o
comparatively small scale. The gold which has made the country famo
occurs in three forms, viz., alluvial deposits, quartz reefs, and beds of co
glomerate rock. The alluvial deposits occur in the valleys of the easte
mountain range, and do not seem to be important. The quartz reefs a
occur chiefly in these mountains on the edge of the plateau. Some of th
have been worked for more than twenty years, and many exist which ha
not yet been fully explored. They would receive more attention but for t
superior attraction of the conglomerate beds where the gold is found,
in "pay-shoots" here and there along the line of a quartz reef, but uniform
diffused through the sandy and clayey matter of the beds. The conglomer
is called "banket," the Dutch name for almond toffee, on account of
appearance, fragments of quartz being imbedded in the arenace

atter. These auriferous beds occur along the edge of a geological sin about 46 miles long and 15 broad in the southern part of the public. The northern rim of this basin is formed by the long rocky lge called the Witwatersrand, and the gold-field, first discovered in 84, is hence known as The Rand. efore the war it produced about 16,000,000 worth of gold annually, d the Transvaal ranked as the first ld-supplying country of the world. ie large mass of rock which is known contain gold, and the generally iform diffusion of the metal through gives gold-mining on the Rand a rtainty found nowhere else, and ake it worth while to expend large ns on sinking shafts and establishing costly machinery. The draw-cks are the difficulty of securing sufficient labour, as the hard work must done by Kafirs, who dislike underground toil, and are moreover uncer-n labourers (especially prone to drink), and the heavy cost of machinery d of food.

FIG. 477.—*The Rand.*

People.—The Transvaal as a whole is very thinly peopled, and many rts of it, especially in the north-east, have no fixed white inhabitants, the ttle farmers being really nomadic in their habits. On the other hand, e Witwatersrand mining district has in Johannesburg the largest town in uth Africa, and is studded with smaller towns. More than half of the ite population live on or near the Rand. Of the whites in 1899 pro-bly one third, or 75,000, were descendants of the Dutch emigrants from pe Colony, most of them speaking only the South African dialect of tch. These figures have, of course, changed since the late war, both solutely and relatively. The remainder, numbering probably 150,000 ough no exact figures are obtainable), had been drawn to the country by the gold-mines, and include English or Dutch speaking colonists from the Cape and Natal, natives of Great Britain, of Australia, of North America, and of Germany, with a few Frenchmen and Italians, as well as Russians. A great many are Jews. The great majority of the new-comers speak English, and they form the trading and artisan part of the population, as well as the skilled miners. The natives are either (1) tribal Kafirs living under their own chiefs in Swaziland and in the northern and eastern districts, domesticated servants of white masters, or (3) comparatively wild firs who have come to the mines to work for a few weeks or months ly, and then return with their wages to their remote homes.



G. 478.—*Average population of a square mile of the Transvaal.*

History.—The history of the Transvaal Colony, although short,

has been chequered and troublous. In 1836 a large number of Bo (*i.e.*, farmers of Dutch extraction), left Cape Colony in disgust at t wrongs which they held themselves to have suffered at the hands of t British Government. Many of them settled to the north-east of the V river, and, defeating the natives who attacked them, formed several sm self-governing communities which ultimately coalesced into one republ The British Government continued to claim the Boers as its subjects 1852, when, by the Sand River Convention, it recognised the South Afric Republic as independent. During the twenty years that followed, t communities were involved in serious trouble with the natives. The co dition of the Republic became so serious that the British Governme feared that its colonies might also be involved in native wars, the inquir it made led it to believe that annexation would not be unwelcome to t people, as this would ensure their protection against the Kafirs and i prove their material interests. Accordingly the country was annexed April, 1877. The Boers were, however, more strongly attached to th independence than the British had supposed, and some grave mistak made by the government increased the spirit of resistance. In the end 1880 it broke out in insurrection, the few British troops were compell to surrender or were cooped up in the forts ; and the Boers who march to the Natal frontier inflicted three defeats on the small British arm which was preparing to recover the country. Convinced that the annex tion had been a mistake, made in ignorance of the sentiments of t people, and fearing that a general war of races might break out in Sou Africa if the conflict were prolonged, the British Government recalled t large force which it had sent out, and which could easily have crush all resistance, and in 1881 concluded a convention whereby the autonom of the Transvaal was recognised subject to the suzerainty of the Briti Crown and to certain conditions, which were modified by the Conve tion of London in 1884. The Republic enlarged its boundaries by acquiri (in 1888) one of the best regions of Zululand, and in 1894 it was allow to annex Swaziland, the territory of a small native tribe lying on eastern border. In 1885 the wealth of the *banket* (conglomerate) gol bearing beds of the Witwatersrand became generally known, and t immigration of foreign miners suddenly and immensely swelled. 1895 there were probably about 100,000 of these new-comers, and th outnumbered the whole of the Boer population. Being excluded fr political rights, they set on foot an agitation to obtain a share of pow and in December, 1895, a body of mounted police in the service of t British South Africa Company entered the Republic in order to supp the agitation. The invading force was, however, defeated and obliged surrender.

In October, 1899, war broke out between the South African Repub and the United Kingdom. Johannesburg and Pretoria were occupied the British troops in June, 1900, but the Boers protracted the strug

ntil May 31, 1902, when a treaty of peace was signed, by which the ountry came under the British Crown. The colony was granted re-ponsible government in 1906, and is administered by an elected house f representatives and an upper house nominated by the Governor. The Boers belong to the Dutch Reformed Church, but all sects have een tolerated, although Roman Catholics and Jews were until re-ently subject to political disabilities. Education has hitherto been in backward state, especially among the pastoral and semi-nomadic popu-tion; and there are no manufactures, nor, in-eed, any handicrafts except those connected ith mining.

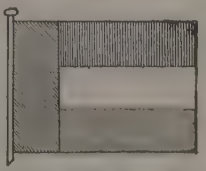


FIG. 479.—*The former Transvaal Flag.*

The railways in the Transvaal belonged, before he war, to a corporation called the Netherlands ailway Company, but have now been taken ver by the Government, and are known as the Central South African Railways." They radiate om Pretoria and Johannesburg to the coast at elagoa Bay on the east, to Cape Town through the Orange River olony in the south, and to Durban through Natal in the south-east. There re also one or two branch lines, and a trunk line to the north has been arried as far as Pietersburg. *Pretoria* is the seat of the legislature, ublic offices, and law courts, but *Johannesburg*, the centre of the and gold-field, is by far the largest and wealthiest town. English is ow spoken by the majority of the inhabitants, but Dutch is still the nguage generally spoken by the rural population. The vast majority f the native Kafirs are heathen and speak only their own languages; a ew, however, understand Dutch.

STATISTICS. (*Estimates.*)

	1890.	1898.
Area of the Transvaal (including Swaziland), square miles	113,642	119,139
Population „	479,128	867,897
White Population „	119,128	245,397
Density of population per sq. mile	4	7
Population of Johannesburg	40,215	102,078
„ Pretoria (white)	5,000	10,000

ANNUAL TRADE (*in pounds sterling*).

	1881–85.	1891–95.	1896.
Imports	700,000	5,726,000	14,000,000
Exports (including gold)	500,000	5,000,000	—

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VI.—GERMAN SOUTH-WEST AFRICA

By Graf von Pfeil.

Position and Surface.—The coast of German South-West Africa about 800 miles long, possesses no important harbours. Angra Pequena and Walfish Bay are gradually being filled with sand by the north-running coast current. Swakopmünde is likely to become useful with artificial aid. South-West Africa may be termed the western part of the Kalahari plateau, which rises gradually and reaches its highest elevation in the region indicated by a line drawn from Mount Omatoko to the Awas Mountains, with an altitude of 8,500 and 6,900 feet respectively. The west end of the plateau is precipitous, forming a mountain range with a meridianal direction, and approaches in Namaland nearer to the coast than in the northern part of the country. West of Windhoek the Mountains develop into ranges with more independent character. From its central and most elevated part the plateau slopes to the north and south as indicated by its river system. The Nosob, Awob and Fish rivers rise in the central mountainous district, and run south and east. Herero land sends the Uomatako in a north-east direction to the Okovango. The precipitous western border of the Kalahari and also the adjacent district called the Kaoko, send their scanty waters through a number of rivers to the Atlantic; but only the Swakop and Kuiseb are important. The Cunene, which for some distance forms the northern boundary of the protectorate, does not belong to its river system; the Orange River, which forms the entire southern boundary, only belongs to it in so far as it is the recipient of all the rivers with a southerly course. With the exception of these two streams and the Okovango no South-West African river is perennial. After heavy rains they fill suddenly, and run for a short time; but water can as a rule only be obtained by digging in the sand which fills their beds. The so-called pans, Etosa and others, are remarkable remnants of a lacustrine formation. Parallel with the coast runs a sandy desert belt, about 35 miles broad in the south, and narrowing to a point in the north. East of this belt a strip of mimosa bush extends to the foot of the mountains, which together with the Kalahari plateau form excellent grazing land. The porous calcareous sandstone which nearly everywhere composes the tableland, and covers the underlying gneiss and granite, retains a large portion of the yearly rains and yields water readily when dug into. Numerous hot springs exist. The climate is nowhere malarious except in the neighbourhood of the

kavango and Zambezi. In the mountainous districts ice occurs requently.

People and Government.—Bushmen and Bergdamaras are pre-mably the primitive inhabitants. Bantu tribes, Hereros and Ovampos, nmigrated from the north. The Hottentots came from south of the range River. The Bantu tribes differ in languages and customs, nd live under influential chiefs. The Hottentots, with but one com-non tongue, are divided into many clans ruled by small but sometimes arlike chiefs. The Bergdamaras live in insignificant communities ithout chieftains. The Bastards, the progeny of Boers and Hottentots, re nearly all Christians, and form communities with tribal habits and ilers. The Bushmen roam in the Kalahari in yearly decreasing numbers. egetation is scanty; the littoral district produces simply mimosas, the esert north of Swakop the welwitschia, on the banks of the rivers ccurs the arra tree, on the sandy dunes the nara. Rare specimens of lephant, rhinoceros, giraffe and buffalo still exist; antelopes are plentiful. outh-West Africa was declared a German possession in August, 1884, fter Lüderitz of Bremen had previously bought the land by private ontract from native chiefs. For purposes of administration the pro-ectorate is divided into three main districts, each the seat of a court of aw, of an administrative officer and garrison for a number of colonial roops. *Windhoek*, the largest and most central settlement, is the residence f the military governor. A railway has been made to it from the coast t Swakopmund.

STANDARD BOOKS.

F. J. von Bülow. "Drei Jahre im Lande Hendrik Witboois." Berlin, 1896.
K. Dove. "Deutsch Süd-west Afrika." Gotha, 1896.

VII.—ISLANDS OF THE SOUTH ATLANTIC

By Edward Heawood, M.A.

Ascension.—The island of Ascension, eight miles in length, rises in 8° S. rom the longitudinal ridge which divides the South Atlantic into an eastern nd western trough. It is entirely composed of extinct volcanic cones, nd except on Green Mountain (2,820 feet) in the south-east, the surface is parched and barren, water being scarce, but the climate is very healthy. Land crabs roam all over the island, and turtles frequent the shores in large numbers in the breeding season. Ascension was discovered by the Portu-guese in 1501, but was long unoccupied. It was garrisoned by Great Britain in 1815, and is entirely under naval rule, being, in fact, treated as a man-of-war. The anchorage is on the north-west coast, where is the small settlement of *Georgetown*. Landing is difficult on account of the rollers.

St. Helena.—The island of St. Helena, in 16° S., 800 miles south-east of Ascension, is an isolated volcanic cone rising from the depths of the

eastern Atlantic. It is bounded by precipitous cliffs, and is composed of rugged ridges and plateaux, the highest ground (2,700 feet) forming a semi-circle concave to the south. When first visited, the island was covered with a rich vegetation, but the introduction of goats, coupled with the destruction wrought by man, ruined the red-wood and ebony forests, and the soil has since been in great part washed away by rain, leaving the slopes barren. Willows, poplars, and other plants of the temperate zone, have been introduced, and the native flora remains only in the most inaccessible parts.

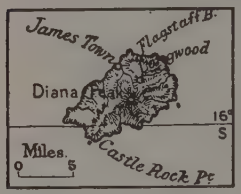

FIG. 480.—*St. Helena.*

St. Helena was discovered in 1502, and, lying in the track of ships carried homewards from the Cape by the trade winds, soon became an important place of call. Occupied by the East India Company in 1651, it became a Crown Colony in 1834, but its importance has greatly declined since the introduction of steam navigation and the opening of the Suez Canal. It is famous as the place of exile of the first Napoleon (1815–21). The settlement of *James Town* occupies the mouth of a narrow valley on the north-west or lee side of the island, debouching on James Bay. The natural resources of the island are not great; but the fisheries off the coast are capable of development.

FIG. 481.—*The Badge of St. Helena.*

Tristan da Cunha, with a few neighbouring islets, rises from the southern end of the same ridge as Ascension, in 37° S. It is bleak and inhospitable, being exposed to storm and rain for nine months in the year. Its highest summit—a rounded cone rising from a plateau ending in a cliff—is snow clad except in mid-summer. The one species of tree, *Phylica arborea*, stunted but fairly plentiful, is almost confined to the group. Tristan was occupied by Great Britain in 1816–17, and the present population (which has lately fallen to about fifty) consists of the descendants of a few of the garrison who remained, reinforced by settlers of various nationalities. They look to the British Government for protection, and are dependent on the occasional visits of men-of-war for communication with the rest of the world

STATISTICS (*approximate*).

Ascension (area in square miles)	58
Population of Ascension	200
St. Helena (area in square miles)	47
Population of St. Helena	4,000
Tristan da Cunha (area in square miles)	45
Population of Tristan da Cunha	50

STANDARD BOOKS.

A. B. Ellis. "West African Islands." London, 1885.
J. C. Melliss. "St. Helena, a Physical and Topographical Description of the Island." London, 1875.
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CHAPTER LIII.—ISLANDS OF THE WESTERN INDIAN OCEAN

I.—MADAGASCAR

By Rev. James Sibree,
Antananarivo.

Position and Exploration.—Madagascar is situated in the Indian Ocean, about 230 miles distant (at its nearest point) from the south-east coast of Africa, and is nearly twice as large as the United Kingdom. It extends from 12° to 25° S., and from 43° to 50½° E.; its length, from north to south, is 980 miles, the main axis of the island running north-north-east and south-south-west. Its broadest portion is near the centre, where it is 350 miles across; from this part of the island its northern half forms a long, irregular triangle, while south of it the average breadth is 250 miles. Although known to Arab merchants for more than a thousand years past, and frequently visited by Europeans since the beginning of the sixteenth century, Madagascar is still but imperfectly explored; since the year 1865, however, numerous journeys have been made in the interior, and every year sees some fresh portion of the country mapped more or less accurately. Conspicuous in this work have been missionaries, both Protestant and Roman Catholic; of the former the late Rev. Dr. Mullens, whose large map (1879) embodied all that was known up to that date; and of the latter, Père D. Roblet, S.J., whose fine map (1889) includes not only his own and other surveys, but also the discoveries of the distinguished French traveller and scientist, M. Alfred Grandidier, whose great work on the island, which is to include over fifty quarto volumes, was commenced in 1875 and is still (1903) in progress.

Configuration.—Madagascar has a very regular and compact form, with but few indentations, considering its great length of shore-line. More than half of the eastern coast runs in an almost perfectly straight line; but the north-west portion is broken up by a number of spacious inlets, some of them land-locked and of considerable area. The island consists of two great natural divisions, (1) an elevated interior region, raised from 3,000 to 5,000 feet above the sea; and (2) a comparatively level country surrounding the high land, and not much exceeding 600 feet in altitude, narrow on the east, but wide on the west and south; it is broken up towards the west by three prominent ranges of hills running north and south.

The elevated region is composed chiefly of gneiss and other crystalline rocks, with enormous quantities of red clay-like earth consisting of decomposed gneiss. It is a mountainous region, there being very little level ground except the river valleys, and some extensive and fertile plains, occupying the beds of ancient lakes. The general face of the interior country consists of bare rolling moors, from which the unstratified rocks protrude and form the highest parts of the hills; these have mostly a rounded dome or boss-like outline, but in some districts present a very varied and picturesque appearance, resembling titanic castles, cathedrals, pyramids, and spires. This interior highland comprises about half the total area of the island, and is not exactly central, the watershed running down the eastern side of the island at no great distance from the coast. Ankaratra, probably an ancient volcano, with summits nearly 9,000 feet above sea-level, is the highest mountain of Madagascar.

The lower region is fertile and well-wooded, especially on the eastern side of the island, which is bathed by the constant rains brought by the south-east trade-winds. The western and north-western portions consist principally of Secondary strata, of the Jurassic and Cretaceous periods, with some Eocene and Quaternary beds. From the south-east to the north-west and north groups of extinct volcanic craters occur, as well as streams and sheets of lava. These old cones and vents are very numerous near Lake Itasy (19° S., 47° E.), in the Betafo district, about 50 miles further south, and to the north on the island of Nosibe, and adjacent coast. Hot springs are found in many parts of the island, and slight earthquake shocks are felt every year.

Hydrography.—Owing to the slope of the high land almost all the chief rivers of Madagascar flow to the west coast, crossing three-fourths of the breadth of the island. The Betsiboka, the Tsiribihina, the Mangoky, and the Onilahy are the largest and most important, and some of them can be ascended by vessels of light draught for a hundred miles or so, until rocky bars stop navigation. The eastern rivers, the largest of which is the Mangoro, cut their way through the ramparts of the high land by magnificent gorges amidst dense forests, descending by a succession of rapids and cataracts. The largest lake is the Alaotra, in the Antsihanaka province. A remarkable chain of lagoons extends for about 300 miles along the east coast, south of Tamatave, forming a natural waterway, which has been improved by the cutting of canals where necessary.

Climate.—The climate of the high interior districts is temperate and healthy, with no intense heat; but that of the coasts is much hotter, especially on the west; and from the large area of marsh and lagoon, malarial fever is prevalent and frequently fatal. The seasons are two, the hot and rainy season, from November to April, and the cool and dry season during the rest of the year. Rain, however, falls almost all the year round on the eastern coast, but is much less frequent on the western side. No snow is known, but hail showers and terrific thunderstorms are frequent in the hot

eason, and hurricanes occur every few years. The average yearly rainfall t Antananarivo for 16 years was 53 inches; at Tamatave, 90 to 100 inches, t Mojanga, on the north-east coast, 50 inches; while average mean nnual temperature at the same places was respectively 62°, 75°, and 79° F.

Flora and Fauna.—All round the island is a nearly unbroken elt of dense forest, varying from 10 to 15 miles across, but most argely developed in the north-east. The flora is therefore very rich and aried, and contains large numbers of trees producing valuable timber, s well as numerous species of palm, bamboo, tree-fern, pandanus, baobab, amarind, and euphorbia. The flora is divided by Rev. R. Baron into hree regions—eastern, central and western. Among the most cha- acteristic forms of vegetation are the traveller's-tree, the Rofia palm, the Madagascar spice-tree, the Casuarina, and the Tangena; and also the urious lace-leaf plant, as well as numerous species of orchids and ferns. Many trees have large and showy flowers. Three-fourths of the species nd one-sixth of the genera of the plants are endemic, showing that the sland is of immense antiquity. About 4,000 indigenous species are known, nd there is one natural order, Chlænaceæ, with 24 species, confined to the sland.

The fauna contains several exceptional and ancient forms of life, com- prising many species and even genera known nowhere else; but, considering ts proximity to Africa, the country is markedly deficient in the larger arnivora and in ungulate animals. Madagascar is specially the home of he Lemuridæ, there being 38 known species of this and allied families of Quadrumana, and also the very curious aye-aye (*Cheiromys*). It is the hief habitat of the chameleons, about half of all the known species being ound here. Of land-birds, 38 genera and 125 species are peculiar to the sland, many of them being unlike any other living forms. The remains of many species of extinct struthious birds (Æpyornithidæ) are found in ecent deposits, some of them being of gigantic size (over ten feet high), nd laying the largest known egg (12¼ in. by 9¼ in.). Fossil remains of mmense tortoises, saurians, and lemuroids have also been discovered.[1]

People.—The Malagasy people appear to be mainly derived from he Malayo-Polynesian stock, and they have also numerous points of connection with the Melanesian tribes, from which the darker element of the Malagasy is probably derived. There is also an admixture of African blood, especially in the western regions; and there is an Arab element both on the north-west and south-east coasts. The Hova, the most advanced, civilised and intelligent Malagasy tribe, nhabiting the central province of Imerina, and the dominant race for the last century, are probably the latest immigrants and the most purely Malayan n origin. Other important tribes are the Betsileo (southern central), Bara further south-west), Tanala (south-eastern forests), Betsimisaraka (east

[1] A decree of the Governor-General in 1898 reserves to Frenchmen alone the right of collecting or searching for these fossils.

coast), Sihanaka (north-east central), and Sakalava (nearly the whole west coast). All the coast peoples, who are much subdivided, appear to be closely connected with each other in language; and, although there are many dialectal differences, the language of the whole country is substantially one, and is nearly allied to Malayan and Melanesian. The Malagasy not having had their language reduced to writing until the early part of the nineteenth century, have no ancient literature, but their numerous proverbs, songs, fables and folk-tales, and their oratorical gifts, as well as the copiousness of their language, prove their intellectual acuteness. In their heathen state they are immoral, untruthful and cruel in war; but they are also courageous, affectionate and firm in friendship, kind to their children and their aged and sick relatives, law-obeying and loyal, very courteous and polite, and most hospitable. While retaining some traditions of a Supreme Being, they practised, and in parts of the island still practise, a kind of fetishism, together with divination, curious ordeals and ancestor-worship.

History.—Madagascar was first mentioned under its present name by Marco Polo (1300), but the Portuguese navigator Diogo Diaz was, in 1500, the first European to see the island. Colonies were subsequently formed on the coast by the Portuguese, the Dutch, the English, and the French, but none of these were maintained for long; although the French held the islands of Ste. Marie and Nosibe, until the war of 1883–85 resulted in their obtaining the protectorate of the whole country, and the war of 1895 gained for them the sovereignty of Madagascar. The island is now a French colony, ruled by a Governor-general, with subordinate officers at all the principal towns and ports, and native officials acting under French authority.

Up to the middle of the seventeenth century Madagascar was divided into a number of independent chieftaincies. About that time, however, the Sakalava, a warlike tribe on the south-west coast, conquered the whole western side of the island, and founded two powerful kingdoms. Early in the nineteenth century the Hova, under Andrianampoinimerina (died 1810) and his son Radama I., threw off the Sakalava yoke and gradually made themselves masters of all the northern half of the island, and of much of the interior and the eastern seaboard. Radama abolished the export slave-trade and gave encouragement to English missionaries, who commenced work at his capital in 1820. They reduced the language to a written form, translated the Holy Scriptures, formed numerous schools, founded Christian churches, and introduced many of the arts of civilised life. The accession of Queen Ranavalona I. in 1828 stopped progress; a severe persecution of the native Christians ensued, until the accession of Radama II. in 1861 reopened Madagascar to Europeans. Thenceforward continuous progress has been made in commerce and civilisation. Under Queen Ranavalona II. (1868–83) Christianity was outwardly accepted by the peoples of the central

provinces. In 1895 there were 1,600 Protestant Christian congregations, with 280,000 adherents, but the Roman Catholic influence, then much smaller, has largely increased owing to the methods adopted by the Jesuit missions. Several colleges and high schools, as well as hospitals, dispensaries, leper asylums and orphanages, have been established; and the mission presses issue 250,000 copies annually of various publications.

Trade and Communication.—The things made in Madagascar are literally "manu"-factures, since all are made by hand. The Malagasy are skilful in the weaving of cloths or *lámba* for their own use, of silk, cotton, hemp and rofia fibre, from which cloths called *rabannas* are made and exported to Mauritius and Réunion. They also plait a great variety of strong and beautiful mats of different vegetable fibres; many thousand mat bags are sent to the Mascarene Islands for packing sugar, and fine straw hats are made, and are the usual head-covering of the Hova and other tribes. The principal exports of Madagascar are cattle, hides, gum-copal, india-rubber, bees-wax and rice, and, more recently, ebony and other valuable woods; coffee, tea, sugar and vanilla are also being cultivated by Europeans. The chief imports are cotton goods, ironmongery, crockery, tinned provisions and rum. The principal trade is from the eastern ports to Mauritius and Réunion, and also with Europe, India, America and South Africa, but France takes a preponderating share. The whole foreign trade was estimated in 1901 at about £1,650,000, of which sum imports (mainly cottons) accounted for about £1,300,000. The soil of the coast plains, especially of the east side, is fertile, and could supply quantities of most tropical productions. Iron is abundant, especially as magnetite, and also as hæmatite and ironstone; and the Malagasy are skilful in the working of this and all other metals. Other mineral productions are copper, galena (lead), sulphur, and gold in considerable quantities. Until the French occupation there were no roads in the country, but these have now been constructed between the principal towns, while a railway has been made from Tamatave to the capital, and others are projected. Telegraph lines have also been opened. Away from the main routes the chief means of conveyance is a kind of light palanquin, carried by four bearers, and all merchandise and produce is carried on men's shoulders. The rivers are largely used by native canoes.

Towns.—The towns are few and of no great size, the largest being the capital, *Antananarivo* (French, *Tananarive*) originally a tribal chief village, then the Hova capital, and finally the chief town of Madagascar. It is built on the summit and slopes of a long, rocky ridge rising about 700 feet above the surrounding valleys. It doubtless owes its position to its situation on the edge of a magnificent and extensive rice-plain, watered by the river Ikopa and its tributaries, which also supports several hundred neighbouring villages. It contains many large and handsome buildings—

palaces, churches, public offices, colleges and schools, and private residences of brick and stone. The only other inland town of importance is *Fianarantsoa*, the capital of the Betsileo province, also near a fine rice-plain, and with many handsome buildings. The chief ports are *Diego-Suarez* in the extreme north, *Tamatave*, *Vatomandry*, *Mahanoro*, *Mananjara* and *Fort Dauphin* on the east coast, and *Majunga* in the north-west.

STATISTICS.

(These figures are estimates only.)

Area of Madagascar (square miles)	230,000
Population of Madagascar	4,000,000
„ „ Antananarivo	60,000
„ „ Tamatave	12,000
„ „ Fianarantsoa	10,000

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———. "Madagascar before the Conquest." London, 1896.

II.—SMALLER ISLANDS OF THE INDIAN OCEAN

By the Editor.[1]

Islands of Indian Ocean.—The British colony of Mauritius is an island in the western Indian Ocean, in 20° S., and about 500 miles east of Madagascar. Several distant groups and scattered islands are attached to it politically. The principal are the Seychelles, Rodriguez, the Amirantes and the Oil Islands, the latter including the Chagos Group, of which Diego Garcia is the most important. The islands of Mauritius and Réunion crown a small rise of the ocean floor everywhere surrounded by depths exceeding 2,000 fathoms, and Rodriguez and the Chagos archipelago are similarly isolated. The other islands, however, and some extensive banks are all based on the great sickle-shaped rise, the western arm of which is occupied by Madagascar, as shown in the sketch-map (Fig. 482). These islands are particularly interesting, from the biological point of view, on account of the singular character and distribution of some of their animals and plants.

Mauritius—Physical Features.—The coasts of Mauritius are generally low, with several deep openings, and fringed by coral reefs. There are, however, only two good harbours—Port Louis, in the north-west, and Grand Port, in the south-east; but the latter, being exposed to the south-east trade wind, is now little used. The central part of the island consists of a plateau, rising into three principal groups of mountains; that in the south-west containing the highest summit in the

[1] Assisted by E. J. Hastings.

island, Piton de la Rivière Noire, which reaches 2,700 feet. The Port Louis group, in the north-west, culminates in the remarkably shaped peak of Mount Peter Botte. The north is low, and in part jungle-covered. There are numerous streams, torrents during the rainy season, but at other times of small volume. Volcanic rocks predominate, but coral rock also occurs. The forests, which formerly covered a great part of the island, are now represented by a narrow coast belt of trees, known as the *Pas Géometriques*, and some other Government reserves in different parts. Ebony was formerly abundant, the coco-nut flourishes, and amongst special forms may be noted a species of pandanus, the fibres of which are used for the manufacture of sugar sacks, and the Ravenala, or travellers' tree, found on the plateaux. The only indigenous mammal is the fruit-eating bat; the numerous monkeys, deer and hares have been introduced. The dodo and a large land tortoise which abounded on the island when the first European visitors arrived are now quite extinct. The climate is, on the whole, healthy, but epidemics of malarial fever have occurred, and it appears now to be endemic amongst the native population. The average rainfall may be taken for the lower parts at about 50 inches, but in the high plateaux (at Curepipe) it exceeds 130 inches. Hurricanes sometimes occur, and cause great destruction.

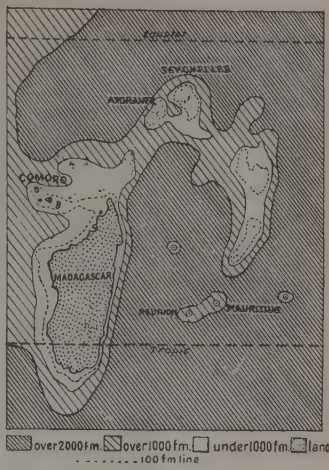

FIG. 482.—*Islands of Western Indian Ocean.*

FIG. 483.—*Mauritius.*

History and Government of Mauritius.—The island was discovered in 1505 by Mascarenhas, a Portuguese navigator, and by him named Cerne, the supposed ancient name of Madagascar; in 1598 a Dutch captain landed at Grand Port, and gave the island its present name in honour of Prince Maurice. In the middle of the seventeenth century the Dutch attempted, unsuccessfully, to make a settlement at Grand Port; many of the slaves whom they brought from Madagascar escaped to the woods, and later these *Marons* caused much trouble to the colonists. In 1715, the Dutch having abandoned the island,

it was taken by the French East India Company. Mahé de Labourdonnais, who arrived as governor in 1735, proceeded with energy and success to develop the resources of the island, establishing Port Louis as the seat of government, introducing the sugar industry, and encouraging the cultivation of cotton and indigo. The colony continued to flourish, and even acquired a degree of local independence, but at the same time it was active in its hostility to British interests and commerce in the east. It was accordingly captured by a British expedition in 1810, and its cession was formally acknowledged by the Treaty of Paris, when Réunion, which had also been taken, was restored to France. The present government is that of a Crown Colony, the entire administration being vested in the Governor; various modifications have, however, been effected at different times, the most important being that of 1885, when a representative element was introduced. The population at the time of the British occupation consisted, besides the French settlers, chiefly of negroes, most of whom had been brought in as slaves. On the abolition of slavery Indian coolies were imported to supply labour, and this has resulted in a great predominance of Indians, who now form two-thirds of the population.

FIG. 484.—*The Badge of Mauritius.*

Trade and Towns of Mauritius.—Agriculture is the only important industry, and sugar-cane is the staple crop. Almost all the necessaries of life have to be imported from India, Australia, Cape Colony and the United Kingdom. The principal export is sugar, which forms nine-tenths of the total. Two lines of railway run through the island. There is regular communication with Marseilles and Ceylon.

Port Louis, the capital and chief town, is situated on the north-west coast. It is enclosed on the land sides by mountains, which cut it off from the prevailing south-east winds, and thus, in part, account for its rather unhealthy character. The houses are built on the slopes of the hills, and there is a good water supply. The harbour is defended by fortifications, and concentrates the foreign trade of the island. *Curepipe*, on the interior plateau, at an elevation of over 1,800 feet, enjoys a cool and healthful climate, and is now the principal sanatorium. There are important botanic gardens and a well-equipped observatory to the north-east of Port Louis.

Amongst the small dependencies of Mauritius which cannot be further noticed are the St. Brandon Isles, Aldabra, noted for its large land tortoises, and the Amirantes Islands, yielding coco-nut oil.

STATISTICS.

	1881.	1891.	1901.
Area of Mauritius Island (in square miles)	705 ..	705 ..	705
Population of Mauritius	360,411 ..	370,934 ..	378,195
Density of population per square mile	511 ..	526 ..	536
Population of Port Louis (with suburbs)	70,000 ..	62,046 ..	52,740

ANNUAL TRADE OF MAURITIUS (*in dollars*).

	1871–75.	1881–85.	1891–95.
Imports	11,965,000	13,440,000	15,950,000
Exports	15,280,000	18,870,000	13,335,000

The Seychelles.—The Seychelles archipelago lies 930 miles north of Mauritius, in about 4° S. The group consists of thirty-four islands, many of which are merely uninhabited rocks. They are mountainous, composed of volcanic rock, and rising to nearly 3,000 feet, well-watered and fertile, with groves of coco-nut palms and fine timber trees, and capable of producing all kinds of tropical plants. The characteristic product of the group is the *coco de mer*, a kind of double coco-nut, which grows only in two of the islands (Praslin and Curieuse), and is found nowhere else in the world. Coco-nut oil is the staple product, and vanilla is an important culture. The islands are surrounded by coral reefs. The climate is excellent. Mahé, the principal island, has on the north-east *Port Victoria*, the small capital, with a fine, sheltered harbour.

The islands, said to have been discovered by the Portuguese in 1505, were explored, by direction of Labourdonnais, in 1743, and a few years later were annexed by France. In 1794 they were taken by the British. The majority of the inhabitants are of African descent; the few whites are chiefly of French origin.

Rodriguez.—Rodriguez lies 350 miles east of Mauritius in 19° 40′ S. It is of volcanic origin, mountainous (rising to 1,760 feet), exceedingly picturesque, and possessing in the south-west beautiful stalactite caverns. It is well-watered, fertile and enjoys a good climate. Maize, fruits and vegetables of various kinds are cultivated; cattle and goats are reared, and fishing is an important industry. The inhabitants are chiefly African. The island was discovered early in the sixteenth century by a Portuguese, Diego Rodriguez. In the eighteenth century it was occupied by the French, and in 1809 seized by the British as a base of operations against Mauritius.

The Chagos Archipelago.—Oil Islands is the general name given to various scattered groups, which have no physical connection, lying between 6½° and 10° S., and between 77° and 48° E., including the Chagos, Eagle or Trois Frères, and Cosmoledo Island. They are mainly used for the production of coco-nut oil, and are for the most part exploited by Mauritian proprietors. The inhabitants are few, chiefly African and Malagasy, and are under the jurisdiction of a travelling stipendiary magistrate, representing the Mauritius government. Diego Garcia, one of the Chagos group, in 7° S., is a coral atoll enclosing a fine harbour, of special importance as a coaling station on the routes between the Red Sea and Western Australia, and between Mauritius and Ceylon.

III.—RÉUNION.

By M. Zimmermann.

Réunion.—The island of Réunion, formerly called Bourbon, situated in 21° S. and 55½° E., near Mauritius, is one of the Mascarene group lying 420 miles to the east of Madagascar (Fig. 482). It is entirely volcanic, although there are no longer active volcanoes in the north-western part where the eroded cliffs of lava surround great corries, or cirques, formed by subsidence, and rise in rugged peaks over 6,500 feet in height. The Piton des Neiges attains an altitude of 10,070 feet. Volcanic activity still manifests itself in the south-east, where the Piton de la Fournaise reaches the height of 8,200 feet. Most of the inhabitants live near the coast, on which there are many small towns, while in the interior, more than 2,500 feet above the sea, the sanatoria of *Salazie* and *Hellbourg* are situated on the windward, or north-eastern, side of the island. The mean annual temperature on the coast at St. Denis is 78° F., and the rainy season lasts from December to April. The island was occupied by the French in 1664, and, thanks to the richness of the coffee plantations, it was one of the most successful of the colonies of the early period. In the nineteenth century the place of coffee as a staple production was taken by sugar, and the planters prospered greatly for a time, although now the competition of beetroot sugar has almost ruined the island. The production fell from 82,000 tons of sugar in 1860 to 34,000 in 1894; in the same period the trade of the colony diminished to one-fifth of its former amount, and the population is also falling off. In addition the suppression of slavery and the institution of universal suffrage have transferred political power from the whites to people of colour: Chinese, Malays, Hindus and Arabs. A railway runs from *St. Benoit* on the north-east coast to the capital, *St. Denis*, in the north, and continues round the coast to *St. Pierre* on the south-west; it is remarkable for the number and length of its tunnels.

Remote Dependencies.—The lonely volcanic islets of St. Paul and Amsterdam, situate about 37° S. in the Indian Ocean, midway between Africa and Australia, and the desolate island of Kerguelen in 50° S. and 70° E., are recognised as French possessions. The islands have hitherto been little visited, except occasionally by sealing and whaling ships. Kerguelen has, however, been touched at by various scientific expeditions, including those of the *Challenger* and *Valdivia*, of the astronomers who observed the Transit of Venus there in 1874, and the German Antarctic Expedition, which kept up a magnetic observatory during 1902.

STATISTICS (about 1895).

Area of Réunion, in square miles	965
Population	172,000
Density of population, per square mile	178
Population of St. Denis	26,000

STANDARD BOOK.

M. Mounier. "Crags and Craters. Rambles in the Island of Réunion." London, 18[illegible]

BOOK VII.—THE POLAR REGIONS

CHAPTER LIV.—THE NORTH POLAR REGIONS

I.—THE ARCTIC RECORD

By Sir Martin Conway.

Arctic Exploration.—The earliest venture in Arctic exploration was the voyage of Pytheas beyond the British Islands about B.C. 300, when the first rumours of the frozen sea and the Arctic night were heard. The voyage of the Norseman Othere, who about A.D. 840 rounded the North Cape and reached the White Sea, is of special interest, as being recorded by King Alfred the Great in a note on his translation of Orosius' History of the World; this was the first record of geographical discovery in the English language. A new period of exploration was introduced by the desire to find a northern passage to Asia under the stimulus of the voyages of Columbus, Vasco da Gama, and Magellan; this led to the development of an extremely valuable trade in cod, seals and whales, which introduced the period of whaling voyages, and the associated cruises of men-of-war sent north by various governments to assist vessels in distress or to explore and protect the fishing grounds. A period of great scientific expeditions next ensued, sent out by governments for the purpose of investigating terrestrial magnetism and conditions of climate, which merged into the still current period of small private, or semi-private expeditions animated by scientific or adventurous motives, and each usually dependent on some definite theory or plan.

The Search for a Northern Passage.—The voyage of Cabot in 1497 was the first which set out with the intention of finding a way to the Indies by the North-west. It resulted in the discovery of the Newfoundland fisheries and the continent of North America. In 1553 the expedition of Willoughby and Chancellor, and in 1580 that of Pet, to find a passage round the north of Asia failed to get beyond the entrance of the Kara Sea, but opened up the profitable trade of the Muscovy Company with the White Sea. Meanwhile Sir Martin Frobisher made a dashing cruise to the westward, and, misled like all the voyagers in northern seas of his period by the errors of the map of the Zeni, believed that he had discovered the beginning of the passage in the deep bay which now bears his name. In 1578 Sir Francis Drake, finding it prudent after a privateering voyage against the Spanish ports on the Pacific coast of South America to return

to England by an unfrequented route, spent some time in a vain search for the hypothetical Strait of Anian from the Pacific side.

Towards the end of the sixteenth century the merchants of London and of Holland took up the question of a North-west or North-east Passage very seriously. John Davis was sent out successively in 1585, 1586, and 1587, and as a result of his explorations he pointed to the entrance of Hudson's Bay as one possible route, and passing northwards up Davis Strait he reached 72° N. on the west coast of Greenland, where he reported "no ice to the north, but a great sea, free, large, very salt and blue and of an unsearchable depth." He named the headland at which he turned "Sanderson his hope of a North-west Passage to India," and Sanderson's Hope it remains to-day. Barents, a heroic Dutch pilot, made three great voyages between 1595 and 1597, which cannot be better summarised than in the title-page of the English translation of his story :—

"The True and Perfect Description of three voyages so strange and woonderful that the like, hath never been heard of before. Done and performed three yeares, one after the other, by the ships of Holland and Zeland, on the north sides of Norway, Muscovia, and Tartaria, towards the Kingdomes of Cathaia and China : shewing the discoverie of the straights of Weigates, Nova Zembla, and the country lying under 80° ; which is thought to be Greenland,[1] where never any man had bin before : with the cruell Beares and other monsters of the Sea, and the unsupportable and extreame cold that is found to be in those places. And how that in the last voyage the shippe was so enclosed by the Ice that it was left there, whereby the men were forced to build a house in the cold and desart country of Nova Zembla, wherein they continued ten monthes together, and never saw nor heard of any man, in most greate cold and extreame miserie ; and how after that, to save their lives, they were constrained to sail over 350 Dutch miles which is above 1000 miles English, in little open boates, along and over the maine Seas, in most great daunger, and with extreme labour, unspeakable troubles and great hunger."

Barents, brave and cheerful to the end, died on the boat voyage, the first of a long series of Arctic victims.

Hudson in 1607 sailed due north between Greenland and Spitsbergen in the attempt to reach Japan across the pole. He reached the farthest north so far attained, 80° 23′. In 1613, when following up Davis's western route, he was cast adrift by a mutinous crew in the bay which perpetuates his name. Baffin, the most successful of the many who sought for a passage from Davis Strait in those years, traced the outline of that gulf north to 77° 35′, pointing out and naming the entrances of Smith and Jones Sounds, and as he believed it to be closed to the northward it came to be called Baffin Bay. For 236 years no other navigator went so far in that direction ; and attempts to find a North-west or North-east Passage were

[1] This was Spitsbergen.

gradually given up. Russian travellers traced out the north coast of Asia on land ; Dezhneff in 1648, and Vitus Bering in 1728 made pioneer sea-excursions through Bering Strait. The employés of the Hudson Bay Company subsequently performed the same service for the north coast of America, Mackenzie tracing the Mackenzie River to the sea in 1798.

The Whaling Cruises.—During the seventeenth and eighteenth centuries and the first thirty or forty years of the nineteenth, large whaling fleets visited the seas east of Greenland and Davis Strait every year, and many of the ships sailed far to the north. Two of the British government expeditions in the eighteenth century are specially memorable ; that under Phipps in 1773 (accompanied by the great Nelson as a midshipman), which reached 80° 48′ north of Spitsbergen, and that under Captain Cook on his third voyage in 1776, when he tried in vain to force a way first eastward and then westward from Bering Strait.

The greatest of the whalers was Scoresby, a master in his craft and one of the most fortunate, an earnest student of nature and a keen explorer. He traced out much of the almost inaccessible east coast of Greenland and in 1806 he carried his ship to the farthest north of the period, 81° 30′. In connection with whaling many government expeditions were sent out to investigate the conditions of ice-navigation, to relieve distressed and shipwrecked crews, or to search for new and profitable whaling grounds.

In one of the few expeditions which set out with the avowed purpose of trying to reach the pole Sir Edward Parry, in 1827, sailed north of Spitsbergen, and by sledging over the ice-floes succeeded in reaching the remarkable latitude of 82° 45′. He continued to struggle on until he found the southward drift of the floes in the East Greenland current carried him more miles to the south in one day than his men were able to drag the sledges northward. During the previous century the Arctic seas had become familiar to seafaring men to an extent that it is now difficult to realise, and it was a common thing for many vessels to winter in the ice.

The Achievement of the Northern Passages.—Scoresby's discoveries revived the dormant interest in Arctic exploration, and in 1818 Sir John Ross was sent out by the British government to search for a North-west Passage by sea. Ross explored Baffin Bay, but failed to find its northern opening, although he met and for the first time described the most northerly tribe of Eskimo. Mistaking Lancaster Sound for a closed bay, he returned without adding to the knowledge of the north-west. In the following year Sir Edward Parry was sent out with the *Hecla* and *Griper*, and succeeded in penetrating Lancaster Sound, threading the channels of the Arctic archipelago to the entrance of Banks Strait, and thus earned a reward of £5,000 offered by the British government to the first Arctic explorer who passed 110° W. Several subsequent voyages led to no advance on this journey. In 1829, on a private expedition under Sir

John Ross, his nephew, Sir James Clark Ross, fixed the position of the North Magnetic Pole on the peninsula of Boothia Felix in 70° 5′ N. and 96° 44′ W. For ten years small parties under conditions of extraordinary hardship continued to trace out the Arctic coast of North America by land, Sir John Franklin, Sir George Back, Sir John Richardson, and Mr. T. Simpson won fame from their heroic and successful efforts in this field.

In 1845 a finely-equipped expedition sailed from England in the *Erebus* and *Terror*, which had just returned from their successful Antarctic voyage, and Sir John Franklin, although fifty-nine years of age, insisted on taking command. His instructions were to use every effort to reach the Pacific from Lancaster Sound. On July 26, 1845, the vessels were spoken by a whaler in Davis Strait: they were never seen again. In 1848 anxiety as to the explorers became acute, and vigorous efforts were made by land and sea, through government and private expeditions, to discover their fate. As a result no part of the Arctic regions has been so minutely explored as that to the north of America. Ships were sent out both by Lancaster Sound or Hudson Bay and by Bering Strait with orders to leave nothing undone which might throw light on the fate of the *Erebus* and *Terror* and their crews. McClure in the *Investigator* entering Bering Strait in 1850, made his way eastward to Barrow Strait, where the ship grounded, and after wintering two years the party left it and travelling over the ice returned to England by a vessel from Baffin Bay. The North-west Passage was not made again until 1905, by Amundsen. The numerous naval expeditions sent out through the straits leading off Baffin Bay encountered an almost unparalleled succession of misfortunes, but many magnificent pieces of exploration resulted, amongst them the sledging journeys of Sir Leopold McClintock, which have never been surpassed. In 1854 Dr. John Rae on a land journey learned from the Eskimo that a great disaster had occurred, and that the Franklin expedition was totally lost. In the following year the British Admiralty gave up the search, which was, however, pursued with increased energy by private effort directed by the determination of Lady Franklin. In 1857 Sir Leopold McClintock sailed in the steam yacht *Fox*, was beset by ice in Melville Bay and drifted 1,200 miles to the southward in the Arctic current before getting free; but the voyage was at once resumed and finally crowned with success. In the spring of 1859 he discovered, in a cairn on King William Land, the only document relating to the Franklin expedition ever found. It stated that Franklin died in June, 1847, and that the ships had been deserted in April, 1848, off the north coast of King William Land, after having been beset in the ice for eighteen months, the crews intending to retreat over the ice to the mainland of North America. Not one survived, and the tragic story remains shrouded in mystery. Yet these men had "forged the last link of the North-west Passage with their lives," for the ships had reached waters navigable to the Pacific.

In curious contrast to the sufferings in the North-west, the record of the single achievement of the North-east passage is one of unclouded success. Baron A. E. Nordenskiöld sailed from Tromsö with a Swedish expedition in the *Vega* in June, 1878, passed through the Kara Sea, rounded Cape Chelyuskin, and was stopped by the winter ice when within 120 miles of Bering Strait, which was entered in July, 1879, and so the first and last voyage to Eastern Asia by way of the Arctic Sea was accomplished.

Expeditions of the "Alert" and "Discovery."—Between 1852 and 1860 Sir Edward Inglefield, Dr. Elisha Kent Kane, and Dr. Isaac J. Hayes, in the British and American Franklin Search expeditions, explored Smith Sound to the northward, and Hayes believed that he had seen a great open Polar sea. In 1870 another American expedition under Hall went still further, and penetrated in the *Polaris* to 82° 11′, where Robeson Channel widens into the Arctic Sea. So promising did this route appear that in 1875 a great Polar expedition was fitted out by the British government in the *Alert* and *Discovery*, and placed under the command of Sir George Nares, who was recalled from the scientific circumnavigation of the *Challenger* for this purpose. Making his way through Smith Sound and the northern channels with much difficulty, for the ice was unfavourable, Nares wintered in 82° 25′ N., on the edge of the Palæocrystic Sea, as he termed the hummocky ice-blocks which beset the margin of the Arctic Sea. His sledging parties traced out the extreme northern coast-lines for hundreds of miles, and on one expedition Commander (now Rear-Admiral) Albert Hastings Markham succeeded in reaching 83° 20′, a higher north latitude than had ever before been obtained; but the sledge parties suffered terribly, scurvy, the bugbear of Arctic travellers, having appeared. Scientific observations of great value in geology, natural history, and especially in meteorology and on the tidal conditions of the Arctic Sea, were made continuously.

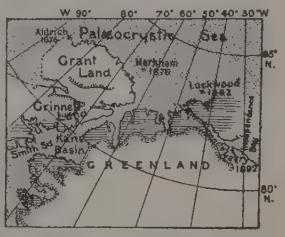

FIG. 485.—*The Smith Sound Region.*

International Circumpolar Observations.—Shortly after the return of the expedition, and of Payer and Weyprecht from their discovery of Franz Josef Land, a scheme was set on foot by the German government for the systematic and simultaneous international study of the physical conditions round the whole border of the unknown polar areas. The plans were settled at two International Polar Conferences held at Hamburg, under the presidency of Dr. George Neumayer, in 1879, and at Bern in 1880; they included complete meteorological and physical observations at special stations situated as far north as possible for a full year, with simultaneous observations at a number of permanent observatories in all parts of the world. The stations which were ultimately

established are enumerated with various particulars in the accompanying table, and it is to be noted that French and German expeditions were sent at the same time to Tierra del Fuego and South Georgia to obtain similar records for the Antarctic area.

THE INTERNATIONAL CIRCUM-POLAR STATIONS.

Lat. N.	Long.	Place.	Duration	Leader.	Nationality.
78° 28′	16° E.	Spitsbergen	July, 1882–Aug., 1883	Ekholm	Swedish.
69° 50′	23° E.	Bossekop	June, 1882–Aug., 1883	Steen	Norwegian.
67° 24′	26° 36′ E.	Sodankyla	Aug., 1882–Sept., 1883	Lemström, &c.	Finnish.
72° 25′	52° 44′ E.	Novaya Zemlya	Aug., 1882–July, 1883	Andreyeff	Russian
71° 0′	64° (*approx.*)	Kara Sea	Sept., 1882–Sept., 1883	Hovgaard	Danish.
73° 23′	124° E.	Lena delta	Aug., 1882–July, 1884	Jurgens	Russian.
71° 16′	158° 40′ W.	Pt. Barrow	Sept., 1881–Aug., 1883	Ray	United States.
62° 30′	115° 44′ W.	Fort Rae	Sept., 1882–Aug., 1883	Dawson	British and Canadian.
81° 44′	64° 45′ W.	Grinnell Land	Aug., 1882–July, 1883	Greely	United States.
66° 36′	67° 192′ W.	Kingawa Fjord	Aug., 1882–Aug., 1883	Giese	German.
64° 11′	51° 40′ W.	Godthaab	Aug., 1882–Aug., 1883	Paulsen	Danish.
70° 0′	8° 28′ W.	Jan Mayen	July, 1882–Aug., 1883	Wohlgemuth	Austro-Hungarian.

The most remarkable of these expeditions was that led by Lieutenant (now General) A. W. Greely, of the United States Army. In addition to carrying out the programme of the international observations at the most northerly station, he and his party explored Grinnell Land and other lands, and made long sledge journeys towards the Pole, the highest latitude attained by Lieutenant Lockwood and Sergeant Brainard being 83° 24′, about four miles beyond Markham's farthest. The expedition sent to bring Greely's party home failed through mismanagement, and his retreat was one of the most disastrous and heroic in the annals of Arctic travel. Most of his men died of disease or starvation, and the surviving six were only rescued when at the last extremity.

The "Tegetthof" Expedition.—In 1872 an Austro-Hungarian expedition was sent out by the generosity of Count Wilczek under the command of Lieutenant Weyprecht for sea service and Lieutenant Payer for land exploration, with the object of attempting to cross the Polar area from the neighbourhood of Novaya Zemlya. Off that island in August, 1872, their ship, the *Tegetthof*, was beset in the ice in 76° 22′ N., and drifted with the wind and currents on the whole northward and westward for a year. Thus they were carried in August, 1873, to an unknown archipelago (Franz Josef Land), where the helpless vessel remained fast for nearly another year. Payer made extensive explorations with dog-sledges, and reached Cape Fligely, 82° 5′ N., as his farthest point. The expedition abandoned the *Tegetthof* in May, 1874, and returned safely in boats to Novaya Zemlya. Mr. Leigh Smith, in the Arctic yacht *Eira*, succeeded in reaching Franz Josef Land easily in 1880, and extended the explorations; but on returning in the following year the *Eira* was lost, and Mr. Smith and his party passed the winter in an improvised hut as bravely as Barents three centuries before, escaping during the next summer by a daring boat journey across the open sea to Novaya Zemlya. Another British expedition, fitted out by Mr. A. C. Harmsworth, under the leadership of Mr. F. G. Jackson, spent

three years in Franz Josef Land in 1894–97, accumulating scientific observations.

The Drift of the "Jeannette" and of the "Fram."—Wrangell Land, discovered by an American whaler to the north-west of Bering Strait in 1867, was at first believed to stretch far towards the Pole. In 1879 Captain W. G. De Long, of the United States Navy, passed through Bering Strait in the *Jeannette*, intending to winter on this land; but his vessel was caught in the ice and drifted north-westward, passing north of Wrangell Land, which proved to be a small island. For nearly two years the *Jeannette* drifted northward and westward, but was crushed by the pack ice, and sunk in June, 1881, when in 77° 15′ N. The crew retreated over the ice with boats and sledges to the New Siberian Islands, and thence to the Siberian coast, where the leader and most of his company perished from hardship and starvation. In June, 1884, some objects were found on an iceberg off Julianehaab, in the south-west of Greenland, which appeared to belong to the lost *Jeannette*. Some authorities believed that the relics did not come from that ship, but others, including Dr. Fridtjof Nansen, maintained that the ice had really drifted across the Polar area and out into the East Greenland current. Confirmed by other pieces of evidence, Dr. Nansen concluded that there is a regular drift across the Pole from the Asiatic to the Greenland side, and he planned an expedition to take advantage of it. Scurvy, the curse of most previous Arctic journeys, he proposed to avoid by the scientific composition of the food carried; the risk of his ship being crushed in the ice was to be evaded by the form of the vessel, which would cause it to be lifted out of the water by the pressure of ice on its sides; there was to be no battling against drifting ice or hostile currents because he was to "take a ticket with the ice," running into the pack near the place where the *Jeannette* sank. If these arguments and expedients, suggested by the history of Arctic voyages and disasters, were correct and sufficient, he expected to return in three years. In August, 1893, with twelve companions, Nansen sailed in the *Fram* ("Forward"), coasted the north-west of Asia, and entered the ice-pack in 78° 45′ north of the New Siberian Islands in autumn. In the summer of 1895, when the ship, resting securely on the surface of the ice, had drifted to 84° N., Nansen and one companion, Lieutenant Johansen, left her and travelled northward on *ski* with dog-sledges until compelled to turn. The "Farthest North" attained on the sea-ice was 86° 14′, a point within 250 miles of the Pole. They reached one of the islands of the Franz Josef Land group, in time to pass the winter of 1895–96 in a shelter, half-cave half-hut, living on the flesh of polar bears and walruses. In the early spring they met Mr. Jackson, and returned in his steamer in August, 1896. By the most remarkable coincidence in Arctic history, the *Fram* broke out of the ice north of Spitsbergen on the very day when Nansen arrived at Vardö; she had drifted exactly in the manner foreseen, and the fortunate thirteen returned

in Greenland in perfect health on the conquered *Frøm*. Scientific results of the highest importance had been obtained and an advance made of 3° of poleward progress.

Other recent Expeditions. Nansen crossed the ice-covered plateau of Greenland from east to west for the first time in 1888. Mr. R. E. Peary, civil engineer in the United States Navy, landed in 1891 on the west coast of Greenland north of Melville Bay where he wintered, and in 1892 made a splendid journey across the northern edge of the inland ice to Independence Bay on the north-east coast, a distance of 700 miles afterwards returning to his base. In 1895 he succeeded in again reaching Independence Bay in very bad conditions of weather, with the loss of all his stores, and only the timely discovery of musk oxen saved him and his companion from starvation; but the farthest advance he had hoped to make was impossible. With extraordinary perseverance he continued to spend year after year in the far north endeavouring, though without much result to train the native Eskimo for long journeys over the frozen sea, and although he came home in 1902, his plans were not abandoned. In 1896 and 1897 the writer explored the interior of Spitsbergen, and crossed it for the first time; and in 1898 Professor Nathorst circumnavigated that island group, and definitely established the geography of the region between it and Franz Josef Land. An attempt by the Swedish engineer Andrée to cross the North Polar area in a balloon must be classed with the mysterious tragedies of exploration. On July 11, 1897, he ascended in the north of Spitsbergen with two companions, and drifted away to the north. Pigeon messages dated two days later showed that the direction of progress had been north-easterly; no trustworthy news has since been received. The Duke of the Abruzzi with a well-equipped expedition in the *Stella Polare* wintered to the north of Franz Josef Land in 1899–1900, and one of his staff, Captain Cagni, supported by a splendid sledge journey in reaching 86° 34′ N. on the farthest sea the farthest north yet attained. An American expedition to the same region in 1901 led to no advance in knowledge, but prepared the way for future explorations. Captain Sverdrup spent the years 1898–1902 surveying the Arctic Archipelago west of Smith Sound, and Commander Peary crossed the farthest point of land in the Discovery in 1906.

There is no reason to fear a cessation of enterprise in this direction until the North Pole is reached, and that sentimental incentive withdrawn. If this consummation is delayed for many years the exploration of the Arctic regions will probably be much more thorough and eventually more complete than if some fortunate adventurer quickly succeeds in reaching the coveted latitude of 90°. The commercial motive to Polar exploration has practically gone with the collapse of the whaling industry, and only science and adventure continue to tempt men into the unknown remoteness of "the white North."

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Sir C. R. Markham. "The Threshold of the Unknown Regions." 2nd ed. London, 1875.
———— " Life of John Davis the Navigator " (includes historical references). London, 1889.
A. Chavanne and others. "Die Literatur über die Polar-Regionen der Erde." (over 6000 titles). Vienna, 1878.
Sir John Barrow. "Chronological History of Voyages into the Arctic Regions." London, 1818.
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Note.—A very full list of narratives of voyages will be found in Greely's "Handbook."

II.—THE ARCTIC REGIONS

By Dr. Fridtjof Nansen, G.C.V.O.,
Norwegian Minister in London.

Definition.—The Arctic circle, in 66° 32′ N., forms the southern limit of the circumpolar region, inside which the Sun does not set during some part of the summer (giving the perpetual Polar day with the midnight Sun), and where the Sun does not rise some part of the winter (giving the Arctic or Polar night). This region is called the Arctic or North Polar region. As the distance of the Arctic circle from the pole is 1,408 geographical miles,[1] the diameter of this region is 2,816 miles; and its total area is 8,201,883 square miles, more than one-fourth of which is still unknown. Taking it as probable that this unknown region is principally sea, it must strike one upon looking at a circumpolar map of the Arctic region how by far the greater part of this area is covered by sea, whilst the land principally forms a circular fringe along its outer margin, being the northern terminations of the two great continental masses of the world—the European-Asiatic and the American-Greenland. Thus the Arctic circle, which is 8,640 miles long, passes about four-fifths of its distance over land and only about 1,800 miles over water; the principal parts of this water are the Norwegian-Greenland Sea (the broad gap between Norway and Greenland), Davis Strait, and Bering Strait which are the three entrances from the open ocean into the Polar Sea.

The Arctic Sea. The Polar or Arctic Sea must be considered as a branch of the Atlantic Ocean; it is a large gulf extending as a deep depression northwards between Norway and Greenland. The width in its narrowest part, between the Lofoten Islands (Norway) and Shannon Island (east coast of Greenland), is about 700 miles; but further north it broadens out to cover the whole central part of the Arctic region. On the other side of the Pole, just opposite Norway, it has a quite narrow communication with the Pacific Ocean through Bering Strait, 50 miles broad and only 27 fathoms deep. The Polar Sea is quite shallow along

[1] The geographical, nautical, or sea mile used throughout the article is one-sixtieth of an equatorial degree.

its whole margin, a shallow submarine plateau extending some distance northwards from the continents on both sides. These plateaux, or drowned plains, evidently mark an old extension of these continents, remnants of which still exist as the Arctic lands, Spitsbergen, Novaya Zemlya, Franz Josef Land, the New Siberian Islands, and the American Arctic Archipelago. Between Spitsbergen and Norway this plateau is in the deepest part 260 fathoms under the sea-surface; in the Barents Sea, between Spitsbergen, Franz Josef Land, and Novaya Zemlya, the depth is about 100 to 160 fathoms. The deepest depression on this plateau, 400 fathoms, occurs just east of Vaigach Island in the Kara Sea. Along the whole Siberian and American coasts its depth is less than 100 fathoms. Its northern limit is not known on the American side. On the Siberian side, east of the New Siberian Islands, it still exists in 77° N. or 350 miles from the main land, with no greater depth than 80 fathoms, and generally much less. North of the New Siberian Islands the plateau, with depths of 50 fathoms or less, extends a similar distance north from the mainland to nearly 79° N., where the bottom suddenly sinks to form a deep sea, with depths of 2,000 fathoms. The northern and eastern extension of this sea is still unknown, but westward we know it extends north of Franz Josef Land and Spitsbergen, with depths of more than 1800 fathoms (probably much more), and the plateau on which these lands are situated probably sinks abruptly not very far to the north of the known land. In 84½° N. north-east of Franz Josef Land (about 75° E.) the depth is 2,020 fathoms. From the north-west corner of Spitsbergen a submarine ridge with depths of 400 and 430 fathoms extends for an unknown distance in a north-westerly direction. It may separate the great depths of the Arctic Sea from those in the Greenland and Norwegian Sea, the deepest part of which is the Swedish Deep of 2,650 fathoms, west of Spitsbergen (78° N.). This depression is separated from the great depths of the Atlantic Ocean by the shallow Færoe-Icelandic (or Wyville Thomson) submarine ridge (250 to

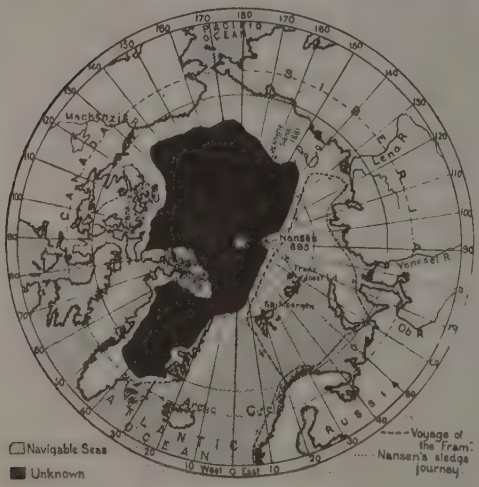

FIG. 486.—*The Arctic Regions.*

300 fathoms deep), passing from Scotland by the Færoes and Iceland to Greenland

West of Greenland there is another gulf, extending from the Atlantic Ocean for 1,170 miles northward into the Arctic region, in its southern part called, Davis Strait, in its northern, Baffin Bay. Like the Arctic Sea, it has a submarine ridge or barrier in the south, whilst it is very deep further north. Davis Strait is in its narrowest part, between Holstenborg, in Greenland, and Cumberland Peninsula (Baffin Land), 160 miles broad, and only about 120 fathoms deep. Baffin Bay, somewhat broader and very deep, is in communication with the Polar Sea by the narrow channels of Smith, Jones, and Lancaster Sounds.

Circulation of the Arctic Sea. – The circulation is very much the same in both these branches of the Atlantic Ocean. On the right hand or eastern side a comparatively warm current runs in; on the left hand or western side a cold current runs out. This condition is to a great extent caused by the rotation of the Earth. A part of the Gulf Stream runs through the strait between the Færoes and Scotland, northward along the north-west coast of Norway and the west coast of Spitsbergen, into the Polar basin. The depth of the channel between the Færoes and Scotland is between 400 and 500 fathoms, which determines the depth of the current. The northern branch of the Gulf Stream keeps the same depth even far north in the Polar Sea. On the west coast of Spitsbergen it is found to be about 110 miles broad, and 400 to 500 fathoms deep. The temperatures of the water are between 32° and 38° F.

The course of the Gulf Stream drift inside the Polar basin is not well known; probably it runs north-east and east, north of Spitsbergen and north of Franz Josef Land. As the cold surface water is diluted by additions of fresh water from the Siberian and American rivers running northward into the Polar Sea, it is less saline and lighter than the warmer, but more saline Gulf Stream water, which consequently sinks under the cold surface layer. In the sea north of Spitsbergen, in about 84° N., the warm Gulf Stream water is found filling the space between 100 fathoms and 490 fathoms depth, with temperatures above 32° (from 32° to 34° F.). The current consequently reaches to the same depth as further south. North of Franz Josef Land, in 85½° N. and 60° E., the temperature of the water between 100 fathoms and 450 or 500 fathoms is also above 32°. As far east as north of the New Siberian Islands, in 81° N. and 130° E., we find almost the same thing: between 120 fathoms and 380 fathoms depth the temperature of the water is above 32° (32° to 33°). How the conditions are in this respect in the rest of the Polar basin is unknown. It receives another though comparatively insignificant contribution of warm water through Bering Strait, where the temperatures are from 37° to 48° F. The water running out of the Polar basin is mostly very cold. The water of the East Greenland Polar current running southward along the east coast of Greenland has temperatures between 31·8° and 29·3°, only quite near the

Greenland coast there is a thin layer of warmer water in about 100 fathoms depth, with temperatures from 32° to 32·8°.

If we consider the Barents Sea separately we find in it the same conditions as in the Greenland Sea, a warm current forming a branch of the Gulf Stream running in on the right hand (*i.e.*, the southern side) eastward round the North Cape in Norway, and a cold current running out on the left hand (*i.e.*, the northern side) along the south coast of Franz Josef Land and the south-east coast of Spitsbergen. Whether much of the warm water actually enters the Polar basin through the opening between Novaya Zemlya and Franz Josef Land may be considered as doubtful.

In Davis Strait a current runs north on its east side along the west coast of Greenland, consisting partly of warm Atlantic water, partly of water from the East Greenland Polar current which rounds Cape Farewell and runs west and north-west along the western coast, carrying drift ice with it for some distance, until the floes are broken up and melt, exposed to the warmer Atlantic water ; and they seldom come further north than Godthaab, in about 64° N. On the west side of Davis Strait a cold Polar current flows out from Baffin Bay southward along the east coast of Baffin Land, carrying much drift-ice as well as Greenland icebergs out past Newfoundland. This polar current is not only formed by the water running north on the east side of Davis Strait, but it receives also contributions through Smith Sound, Jones Sound, and Lancaster Sound, where the currents run into Baffin Bay.

Ice Conditions of the Arctic Sea.—The warm and cold currents of the Arctic Sea naturally determine the formation and distribution of the sea-ice or drift-ice. Where warm currents run in northwards there is but little ice formed, and the ice is carried away northward ; thus we find no ice on the north coast of Norway, comparatively little on the west coast of Novaya Zemlya, and generally none in summer on the west coast of Spitsbergen, and comparatively little even in winter. As may be expected, it is in this region that open sea is found furthest north ; in favourable seasons open water may occur at least as far as 82° N. north of Spitsbergen. In Davis Strait and Baffin Bay the conditions are not so favourable, but in good seasons the west coast of Greenland is nearly free of ice as far north as Smith Sound. West and north-west of the New Siberian Island there is much open water in summer, extending at least to 79° N. On the East Siberian and Alaskan side of the Polar basin there is comparatively little open water. North of Bering Strait it seldom extends much higher than 73° N.

Where the cold polar currents run out or southward we generally find much ice, which is constantly being carried out of the Polar Sea, and often far south. Thus the south coast of Franz Josef Land, the east and south-east coasts of Spitsbergen are blockaded most part of the year by drift-ice. The same is the case along the whole east coast of Greenland,

where the ice is carried south of Cape Farewell. Along the east coasts of Baffin Land and Labrador masses of floe-ice are carried still further south.

The distribution of the ice varies during the year, not only because of the difference in the melting on account of the variation of solar heat in summer and winter, but also to a great extent on account of the seasonal changes in the winds and currents. Observations are, however, lacking on this subject. The interior Polar Sea or the Polar Basin is mostly covered with floating ice, which does not form a continuous or unbroken ice-sheet, as it is always being broken up into floes by the winds and tidal currents. This ice is in constant motion, mainly on account of the winds. The winds often change their direction, and before the direction of the drift of the ice can be changed, the result may be heavy ice pressures, breaking and piling up the ice in ridges and hummocks. Such pressures also arise from the changing tide-currents, especially at spring-tide. This is principally the case near the outskirts of the Polar Sea. The average direction of the winds during the year is from the Siberian and Bering Strait side towards the Greenland side of the Polar Basin. The drift ice is consequently yearly being carried across the Polar Sea in this direction, and is either carried southwards along the east coast of Greenland, or is choked up against the north coast of Greenland, Grinnell Land, and the American Arctic Archipelago, perhaps at last to find its way out through some of the channels.

Icebergs.—Icebergs are quite different in their origin and formation from the sea-ice or floe-ice, and occur only in the outskirts of the Arctic Region, especially in Greenland and Labrador waters. While the floe-ice is formed on the surface of the sea, icebergs originate from the glaciers, and are formed on land. Their height above the sea may be 200 feet or more, about eight times the bulk of ice seen above water is submerged, thus the weight of a single berg may be millions of tons. Most of them are formed in the glacier-fjords on the east and west coast of Greenland. By the Polar current they are carried southward along the east coast, round Cape Farewell. On the west coast they drift northward until they are all carried across Davis Strait or Baffin Bay into the Labrador current, which floats them southward into the Atlantic Ocean, where they form a well-known danger.

Climate.—The physical condition of the Arctic regions is mainly affected by the climatic conditions, but our knowledge in this respect is still so deficient that it is very difficult to make any useful generalisation. The atmospheric pressure and the wind regulate the movements of the currents and drift-ice. These conditions regulate the temperature and the precipitation, which again regulate the formation of ice and the accumulation of snow into glaciers and ice-caps. At the same time the temperature, the currents and the distribution of ice affect the winds.

Arctic Winds.—The winds of the Arctic regions taken as a whole, cannot be said to be very strong, neither can the Arctic region as a whole

be said to be very windy. But on the outskirts in such places as Franz Josef Land, Novaya Zemlya, Spitsbergen, and also Greenland, where there is an immense expanse of ice-covered sea or land on one side, whilst the open sea is not far off on the other, the climatic conditions are unsettled, and strong gales may be very frequent, especially in winter. These gales also bring sudden changes of temperature, and rises of more than 35° F. in less than a day are not uncommon. Remarkably warm winds sometimes occur on the coast of Greenland; they are, however, mere local phenomena akin to the föhn of the Alps. Fogs and precipitation are frequent. In the interior of the Polar Basin the climate is quite different. Over these extensive plains of ice-covered sea the climatic conditions are very uniform and have great stability. Gales are comparatively rare, and are never strong. The same clear weather, especially in the winter, with comparatively little wind may last almost continuously for weeks or even months. The temperature varies very little, though a strong wind nearly always brings a rise of temperature. Fogs are only formed in the late summer, when there is much fresh water in ponds on the top of the ice, and many open channels between the floes.

Arctic Temperature.—The temperature is mainly influenced by the winds and currents, and by the distribution of ice and land. Extensive land-masses will, on account of the radiation of heat, cause a very low winter-temperature, and also a comparatively low annual temperature; this will be still more the case if the land is covered by a snow or ice sheet. An extensive sea will, even when it is covered by floating ice, cause a comparatively high annual temperature and reduced extremes both of summer and winter. On account of the peculiar distribution of land and water in the Arctic regions we can therefore understand that the lowest temperature is not to be sought near the geographical pole, but near the great land-masses. The lowest temperature ever observed on the Earth is —90° F. (—68° C.) in Verkhoyansk, in East Siberia, only some fifty miles north of the Arctic circle, whilst the lowest temperature observed during three winters in the Polar Basin as far north as between 85° and 86° N. was only —63° F. Instead of one pole of cold there are two, or rather three; one in north-eastern Siberia (north of Yakutsk), one in the north of America (north of the Parry Islands), and a third in the interior of Greenland. The highest annual temperatures inside the Arctic regions are to be found along the north coast of Norway and the west coast of Spitsbergen, where the Gulf Stream, with much open and warm water, exercises a remarkable warming effect.

Arctic Flora.—The distribution of the vegetation in the Arctic region is greatly influenced by the temperature of the summer, the winter temperature is not of much importance. Thus the line of forest can be said nearly to follow the July isotherm of 50° F. Forests of pine trees or larch go farthest north in the north of Norway, and along the Siberian rivers, where on the Khatanga they reach the farthest point, nearly 73° N. North of

the line of forest, dwarf birches, willows, and other low shrubs grow, besides a quantity of Arctic flowers, grasses, mosses, and lichens. In Greenland there are no forest, or real trees, but in the south the dwarf birch, the juniper, the alder (*alnus*), and especially the willow may form small low woods, which in sheltered places may even reach the height of a man or more. In north Greenland only creeping dwarf willows are found. In Arctic America there is a somewhat similar distribution of bushes and shrubs. In Spitsbergen the only bushes found are rare dwarf birch and some dwarf willows. In Franz Josef Land there are no bushes or shrubs, the vegetation consists only of the most Arctic plants and flowers, including *Saxifraga oppositifolia*, *Draba alpina*, *Cochlearia fenestrata*, and the Arctic poppy (*Papaver nudicaule*).

Arctic Fauna.—The distribution of animals is perhaps less influenced by the climate. In the Arctic Seas there is an abundance of lower animal life on the bottom as well as at intermediate depths, even in very high latitudes, though it decidedly decreases with the latitude or perhaps rather with the distance from the open sea. Fishes are not very numerous far north, some species of *cottus*, a small species of codfish (*Gadus polaris*) and a few others are probably the most Arctic of all. The Polar shark (*Scymnus borealis*) also seems to go very far north into the ice-covered sea.

Birds do not occur in a large variety of species in the Arctic regions, but there is often a great abundance of individuals, and the bird-rocks or rookeries of Spitsbergen, Franz Josef Land, and Greenland, with thousands of guillemots, dovekies, little auks, kittiwakes, fulmars or mollymawks, and various species of Arctic gulls, form a very characteristic feature of Arctic scenery. In summer straggling birds may probably be found everywhere inside the Polar Basin.

Mammal life is found on most of the Arctic lands as well as in the sea. Of land mammals the polar bear and the polar fox are most widely distributed; they are found straggling over land and sea almost everywhere inside the Arctic circle. The reindeer has also a great circumpolar distribution; it occurs in all Arctic Europe, Siberia, Arctic America, Greenland (on the west coast and on the north-east coast), Spitsbergen, and Novaya Zemlya, but not in Franz Josef Land, though post-glacial reindeer antlers have been found there. The reindeer does not go so far north as the musk ox, which now, however, only occurs on the north-east coast and the north coast of Greenland and in Arctic America, though in earlier periods it had a quite circumpolar distribution. In the Arctic Seas there is more mammal life than in any other part of the ocean, and here we even find some of the largest animals which ever lived, the whales. The best known whale by name is the Greenland whale or the right whale, which is very valuable on account of its long whalebone. It was once abundant and had a wide distribution, but is now nearly extinct; it does not go far into the ice-covered seas. There are several other, but less valuable, large species of whales, besides a good many smaller ones. The most Arctic of all

whales is the narwhal or sea-unicorn, which goes far into the ice-covered sea, and occurs in the Polar Basin as far north as 85° N., and probably much further. The walrus is a circumpolar Arctic animal, but is now nearly extinct in a good many places, where quantities were killed in earlier times. Of seals there are several more or less Arctic species—the bladdernose (hood seal), the saddle back (harp seal), the bearded seal (*Phoca barbata*), and others. The most Arctic species is the ringed seal (*Phoca fœtida* or *hispida*), which straggles far north into the Polar Basin at least north of 85° N.

Arctic People.—The human race is distributed along the whole fringe of European, Asiatic, and American land inside the Arctic circle. There are a good many distinct tribes. In Arctic Norway the original Arctic people are the Lapps. In Arctic Russia and Siberia there are various tribes of Samoyeds, Zyryans, Tunguses, Yakuts, Chukches, and others. The greater part of the Arctic Siberian coast is not, however, inhabited. In Spitsbergen and Franz Josef Land there have never been any permanent habitations, but in Novaya Zemlya a few families of Samoyeds live. The most polar of all people are without doubt the Eskimo.

GREENLAND

Greenland is the largest and also in many respects the most interesting Arctic land. From 59° 45′ N. it extends over more than twenty-three degrees of latitude to north of 83° N., its northern termination being still unknown. The greatest breadth is in 77° 30′ N.—about 690 miles. Its area has been estimated to be 512,000 square miles. The whole interior of this land, or more than 320,000 square miles, is completely buried under an enormous glacier ice-sheet, or inland ice, which only leaves exposed a more or less narrow belt of barren, rocky ground along the shore, cut into by deep and narrow fjords, very much like those of Norway. The broadest exposed strip is 100 miles wide on the west coast, in the district of Holstenborg, 67° N., and 60 miles in the district of Godthaab, about 64½° N. Elsewhere it is quite narrow, and the margin of the inland-ice approaches the outer sea coast. The same is the case along most of the east coast, except in the northern part, between 70° N. and 74° N., where the margin of the true inland-ice appears to be situated in some place at a distance of about 130 miles or more inland from the sea; but the land outside is partly covered by local glaciers. The northern part of Greenland, north of 82° N., does not seem to be covered by the inland-ice or by glaciers.

Configuration and Glaciers.—Greenland is unusually mountainous. Wherever the coast is seen it is rocky and jagged, with high peaks and mountains and deep valleys and fjords. Along the whole of the east coast mountains between 5,000 and 8,000 feet are quite common, often not far from the sea. The highest peak known is Petermann Peak, near Franz Josef Fjord, which is estimated at 11,000 feet. On the west coast the

mountains are not so high, but even there peaks of 5,000 or 6,000 feet are not uncommon. We know nothing of mountains in the interior, as they are entirely covered by the inland ice, but if the ice-sheet were removed it is highly probable that the surface of the land would resemble that exposed near the coasts. The fjords were once filled with glaciers coming from the inland ice and discharging into the sea to throw off icebergs. Many of them are still partly filled with glaciers in this way, and most of them have glaciers discharging into them, and thus preventing us from tracing them in their whole length. Along the coast there are numerous islands, the largest known being Disco Island, in about 70° N. on the west coast. There is probably no other land of the same size which has such an enormous coast-line compared with its area. The largest fjords on the west coast are Umanak Fjord, North and South Ström Fjord (both about 90 miles long), and Godthaab Fjord. On the east coast, amongst others, Scoresby Fjord is about 160 miles long, and Franz Josef Fjord probably of similar length. These are longer than any in Norway, and are probably the largest typical fjords in the world.

There are still some parts of the Greenland coast which have not been explored, especially the north-east coast between Cape Bismarck and Independence Bay (81° 37′ N.), on the east coast, and between the latter and Cape Washington, on the north-west coast. The east coast, between 66° and 69° N., also still waits to be explored.

Geology.—The geological structure of Greenland is naturally little known, as we can only judge from the exposed rocks seen along the coast. According to these it is probable that by far the greater part of the rocky surface of the present Greenland consists of Archæan formations principally gneiss and other crystalline rocks. In the middle parts of the country, about latitude 70° to 73° N., there is a flow of basalt over great parts of the west coast at Disco Island, Nugsuak Peninsula, and Svartenhuk Peninsula, as well as of the east at Scoresby Sound and further north. These basalts, which probably are of Tertiary origin, cover considerable layers of the Tertiary and partly also the Cretaceous formations, which they have thus prevented from being destroyed; and on Disco and the Nugsuak Peninsula there are some of the most famous localities for Tertiary plant-fossils in the world. Jurassic strata are found in several places on the east coast (about 70° N. and 75° N.). They are perhaps of the same formation as in Franz Josef Land, Spitsbergen, Andö in Norway, and in Russia.

Greenland does not seem to have much mineral wealth. Cryolite is the only mineral mined, and is a speciality for Greenland. There is only one mine, at Ivigtut, on the south-west coast (in 61° 10′ N.). Native iron is found in several places, the most remarkable find is the iron of Ovifak (or Uifak), on Disco Island—several large masses, the largest of which is calculated at twenty tons. This iron is evidently of telluric

origin, and has originally been included in the basalts. In 1897 a still larger mass was brought back from Cape York, in North Greenland, which is estimated to weigh ninety tons, and is believed to be of meteoric origin.

The Inland Ice.—Instead of river systems we find in Greenland the great inland ice, and instead of great rivers we find the moving glaciers, the prolongations or outlets of the inland ice, slowly moving into the sea, and thus chiefly effecting the drainage of the country. The greater part of the precipitation in Greenland is not rain, but snow which, to a great extent, does not melt, but is accumulated on the surface of the inland ice, and by the pressure of its weight gradually becomes transformed into glacier ice. This, being a plastic or viscous mass, is pressed out to the sides by the pressure inside the ice mass, and it slowly flows outward, as a lump of pitch or wax which is placed on a table. The pace with which it moves is regulated by the pressure—the higher pressure or the greater mass added on the top the quicker is the motion. Thus the inland ice sends out glaciers through the valleys and into the fjords, the ice at the end of some glaciers being from 1,000 to 2,000 feet thick. The rate at which the glaciers advance into the sea differs much, and to a great extent depends on the extension and thickness of that part of the inland ice for which they form the "outlet" or "drainage." The highest rate of glacial motion ever known is that of the Upernivik Glacier, on the west coast, 73° N., which in summer advances 99 feet every twenty-four hours. The Jacobshavn Glacier, and other known glaciers, move about 50 to 60 feet daily in the summer time. In winter the motion is somewhat slower. The actual amount of ice discharged into the sea from Greenland may be estimated at 1,000,000,000 tons annually at least.

The drainage of Greenland is not, however, effected by this outflow of solid ice only. A great deal more is accomplished by running water. On the surface of the inland ice there is much melting going on during summer near its outer margins. The water thus produced finds its way as small brooks down through the enormous ice-sheet to the bottom, and runs as sub-glacial rivulets from under the glacier-covering into the sea. Where the ice-sheet is very thick, the temperature of the ice is probably near its melting point at the bottom, on account of the internal heat of the Earth. Some melting is therefore probably also going on from this cause, producing water which joins the sub-glacial rivers.

The inland ice covers the whole interior of Greenland, extending as a regular shield from coast to coast. Its surface forms a smooth snow-plain, arching high above the irregularities of the underlying ground, and sloping quite slowly and gradually from the highest ridge in the interior towards the coast on all sides. The highest ridge is in the southern part of the country, somewhat nearer the east coast than the west, and has, between 64° and 65° N., a height of 9,000 feet above the sea-level. How these

conditions are in the interior further north where the inland ice is broadest is still unknown. What the thickness of the ice-sheet is we cannot know so long as the heights of the mountains underneath are unknown, but as the bottom of the valleys are not probably on the average more than 2,000 —or let us say 3,000—feet above sea-level, the thickness of the ice must at any rate in some places be above 6,000 feet. A sufficiently cold climate is not the only condition necessary to produce an inland ice; it also depends on the quantity of precipitation. The precipitation in the most northern part of Greenland does not seem to be sufficient for its formation, and therefore the land north of 82° N. is probably not covered by continuous ice.

People of Greenland.—The hardy Eskimo race extends along the whole Arctic coast of America and Labrador, along the coasts of the eastern islands of the American Arctic Archipelago, and along the coast of Greenland as far north as Smith Sound (about 78° or 79° N.). A small Eskimo tribe is also found on the Asiatic side of Bering Strait. The Eskimo live mainly by hunting and fishing on the sea, and are therefore bound to be a coast people. In the summer they go hunting and fishing in their small boats or kayaks, made of drift-wood covered with sealskin. In the winter they travel over the frozen sea in their sledges with dogs, which are their only domestic animals. They are a far and quick-travelling people, and traces are found of them over vast tracts of country where they do not live at present. In the summer they live in tents made of skins, in the winter they live in low stone huts, or, where stone is not available, they build snow-huts of a peculiar shape, resembling beehives. They are a gifted and hardy race, and with admirable skill they have known how to make their ingenious weapons out of pieces of driftwood, bones, skin, and stone, partly, also of native iron—the only means which a barren nature originally gave them: now they have of course got iron, as well as firearms from the Europeans, but these gifts have not been wholly to their advantage.

In Greenland there is altogether a population of about 10,000 Eskimo, and a few hundred Danes who administer the country. The Greenland Eskimo are, however, no longer a pure race, but are greatly mixed with European blood. The contact with European civilisation has there, as elsewhere, been of very doubtful advantage to the natives, who show a slow but certain decadence.

The Eskimo and half-breeds of southern Greenland are to some extent grouped around the Danish settlements, all trade with which is a Government monopoly of Denmark. Some of the principal administration and trading centres are *Julianehaab*, the most southerly (60° 40′ N.), *Godthaab*, and *Upernivik*, the most northerly, in 72° 48′ N. The Eskimo of Smith Sound, a small tribe, have no dealings with the Danish settlements. The principal settlement on the east coast is *Angmagsalik* in 65° 30′ N., where there are a few hundred Eskimo, and lately a Danish mission has been established.

ARCTIC ISLANDS

Franz Josef Land.—Franz Josef Land is a group of numerous comparatively small islands situated in about 80° to 82° N., and extending from longitude 42° E., eastward, probably beyond 62° E., but the eastern extension is still unknown. Land was reported further north and named Oscar Land and Petermann Land, but recent explorations seem to have proved that they do not exist. Some of the islands of Franz Josef Land are comparatively low and flat, but the highest are 2,000 to 3,000 feet above the sea-level, consisting of basalt,[1] partly resting on a thick formation of Jurassic clay. The islands are with few exceptions completely ice-capped, the ice-covering sloping regularly into the sea on all sides, allowing the basaltic rocks to project only here and there along the coasts. These islands therefore have a more glacial aspect than any other Arctic land; they are, however, much too small to form the base of any glaciers or ice-sheets of importance. Icebergs are formed in a good many places, but they are few and small compared with those of Greenland, and they do not travel far, for round Franz Josef Land the water is too shallow to float icebergs of any size

Spitsbergen.—Spitsbergen is a group of islands situated between 76° and 80½° N., and between 10° and 32° E. The principal islands are West Spitsbergen, which is the largest, North East Land, Barents Land, Edge Land (or Stans Foreland); on the west coast is Prince Charles Foreland, and to the east is Wiche Land (or King Karl's Land); to the south-east is Hope Island. Besides these there are many small islands, the most northern being the small Seven Islands (80° 48′ N.). To the east of North East Land land was seen in 1702, and called Gilles Land. It is perhaps this island which Norwegian walrus-hunters believe they have seen several times, and which they have called White Island or New Iceland. In the sea between Spitsbergen and Norway there is a small island called Bear Island.

The margin of Spitsbergen is a typical glaciated coast, much like that of Greenland and Norway. It is deeply cut and intersected by long and narrow fjords and sounds. Though comparatively small as the island of West Spitsbergen is, it has fjords of considerable length—Ice Fjord, on the west coast, is 60 miles long; Wiide Bay, on the north coast, is 50 miles long; Bell Sound, on the south-west coast, is 30 miles; Hinlopen Strait, between West Spitsbergen and North East Land, is a narrow channel, 100 miles long, with the character of a typical fjord.

Spitsbergen is a mountainous country with peaks and valleys, but the mountains do not rise to great heights, as a rule no more than 2,000 to 4,000 feet. The most important mountain-ranges with more alpine forms are

[1] Though basalts and lavas of comparatively recent geological origin (Tertiary and perhaps Jurassic) occur in many places in the Arctic regions, there is only one active volcano known north of the Arctic circle, viz., the little island Jan Mayen, east of Greenland in the Greenland Sea, with the Beeren Berg (7,000 feet).

situated near the west coast. Eastward the land is lower, and the mountain are generally more rounded. The highest peaks known in Spitsbergen are Horn Sunds Tinder, near South Cape (76° 55′ N.), about 5,000 feet.

The snow and ice seem in Spitsbergen to have a tendency to accumulate and cover the land more in the east part of the country than in the west—a condition similar to that in the south part of Greenland.

The interior of West Spitsbergen is not covered by a genuine inland ice, like that of Greenland, overflowing the whole area and drowning all the valleys and mountains. In various parts of the island, however, extensive local glaciers, or a glacier-covering, exist in the interior, which is not mighty enough to drown the main features in the orographical configuration of the underlying land. They resemble the great ice fields of Norway, and discharge glaciers down through the valleys into the ends of the fjords, where the ice breaks off, but the pieces are not large enough to be called icebergs.

The greater part of North East Land is covered by an ice-sheet, which may be called a small inland-ice. The height of its smooth, regularly curved surface, gradually sloping downwards towards the coasts, is more than 2,000 feet above the sea in its highest part. On the east and south coast this inland ice descends into the sea, whilst the west and north coast is not covered by ice.

Spitsbergen consists mostly of primitive rocks. Some districts, especially in the eastern part, are overflowed with basalt, probably of Jurassic or Tertiary origin, and perhaps similar to the great basalt flow of Franz Josef Land. In some parts of West Spitsbergen there are Tertiary formation with interesting plant fossils.

The mineral wealth does not seem to be of much importance, though in some places there are beds of tolerably good coal.

Novaya Zemlya.—Novaya Zemlya, which is divided into two large islands by the narrow sound, Matochkin Shar, is a quite Arctic land, and its whole character resembles that of Spitsbergen. The land is mountainous, and the coast is intersected by fjords, which are not very long. In the north there are extensive glaciers in the interior, probably similar to that of West Spitsbergen, and glaciers discharge into the ends of the fjords.

Arctic Siberia.—Arctic Siberia is to a great extent low and barren undulating plains, the tundra intervening between the northern forest limit and the desolate Polar shores, and intersected by great rivers. The most mountainous part of Arctic Siberia seems to be Taimyr Land, where there appear to be several, though not very high, mountain ranges. The north coast of Siberia, which is as a rule very low and flat, is not so much intersected by fjords or bays as the coasts of most Arctic lands. An exception is perhaps to be found in the little-known but somewhat mountainous coast between the mouth of the Yenisei and the Taimyr Bay, where there probably are fjords, and where there are a good many islands lying scattered in the shallow sea outside.

Arctic Siberia has no glacial covering, and here are not even any local

glaciers known. If such exist, almost the only place where they can be is the Chelyuskin Peninsula (the most northern point), and even there they must be very small. The reason of this is that the climate is too dry to allow of any yearly accumulation of snow. Along the northern coasts there are only patches of snow in the depressions and small valleys, which do not vanish in summer. One of the most interesting features of Arctic Siberia is that the soil is frozen for great depths below the surface, with intervening layers of real blue ice, called rock-ice or ground-ice. On the top of this rock-ice there may be a layer of soil, a foot thick or more, on which forests of larch and other trees grow. Frozen remains of the mammoths and other animals, which have lived there probably later than the Ice Age, are found, and in some cases the frozen corpses of mammoths still retain their flesh, skin, and hair.

New Siberian Islands.—The New Siberian Islands, north of the Siberian coast, are surrounded by a very shallow sea, and are comparatively low with rounded forms. They contain Silurian and Tertiary formation, the latter with a highly interesting fossil flora (the "wood-hills" of New Siberia). On some of them, especially the southern one, Great Liakhoff Island, there are important finds of mammoth remains and valuable mammoth tusks. To the north of these islands are Sannikoff Land and Bennett Land; the size of these is unknown, but they are probably not very large.

Arctic America.—Arctic North America is in character much like Arctic Siberia, but is somewhat more mountainous. North of the continent the numerous islands of the Arctic Archipelago are comparatively low, and have generally more or less rounded mountain forms. There is nowhere sufficient precipitation to form an inland ice, though on some of them, especially in the east, there are great local glaciers, *e.g.*, Baffin Land, North Devon, Ellesmere Land, and Grinnell Land. The last named, the northern part of which is also called Grant Land, is, besides Greenland, the most northern land visited by man. It rises to elevations of 2,000 and 3,000 feet. In this land (in Lady Franklin Bay, 81° 45′ N.) is found the most northern deposit of coal, with a fossil Tertiary flora, including thirty species of plants, pines, birch, poplar, elm, and hazel.

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CHAPTER LV.—THE ANTARCTIC REGIONS

By Sir John Murray, K.C.B., F.R.S.,
Director of the Reports of the "Challenger" Expedition.

The Antarctic.—The term Antarctic is applied to that region of the Earth's surface surrounding the South Pole. The Antarctic Ocean is, strictly speaking, bounded to the north by the Antarctic circle, but the term is usually applied to the great circumpolar ocean which is affected by floating pack ice. The whole of the Southern Ocean may, indeed, be at times affected with ice, Antarctic icebergs being frequently encountered north of lat. 45° S. in the southern parts of the Pacific, Atlantic, and Indian Oceans.

History of Exploration.—After the torrid or fiery zone of the ancients was crossed towards the end of the fifteenth century, the vague conception of a vast continent towards the South Pole was widespread among geographers and explorers, and New Guinea and parts of the land about Magellan Strait were believed to be portions of it. With the progress of exploration the outlines of this southern continent became more and more circumscribed. Tasman, in 1642, showed that Australia and Tasmania were surrounded by water to the south, but New Zealand, which he visited, was believed to be part of the Austral continent, even up to the time of Cook's first voyage, when New Zealand was proved to be an island. In 1772 Kerguelen went to explore the land reported to the south of the Cape of Good Hope, and sighted Kerguelen Island, which he supposed to be a part of the great southern land.

FIG. 487.—*The Antarctic Regions and Southern Ocean.*

At last, in 1772, Cook was dispatched on his second voyage with the express object of finally settling the question of the existence of the reported southern continent, and he proved that if it existed it did not

extend beyond the Antarctic circle. Cook pushed as far south as lat. 71° 10 S. in long. 107° W., while two later explorers attained even higher southern latitudes, viz., Weddell, who in 1823 penetrated as far as lat. 74° 15′ S. southwards of South Georgia, and Sir James Clark Ross, who in 1842 reached lat. 78° 10′ S., discovering Victoria Land, and landing upon Possession and Franklin Islands. Of other explorers we may mention: Smith (1819), Bellingshausen (1820), Powell (1821), Morrell (1823), Biscoe (1830), Kemp (1834), Balleny (1839), D'Urville (1839–40), Wilkes (1839–40), and Moore (1845). More recently Dallman, in 1873–4, visited the neighbourhood of Graham Land; in 1874 the *Challenger* Expedition penetrated beyond the Antarctic circle on the voyage from the Cape of Good Hope to Australia. Between 1893 and 1895 whalers from Scotland and Norway visited the Antarctic regions, landings being effected on Seymour Island by Larsen, and on Victoria Land at Cape Adare by Kristensen. The *Belgica*, under Gerlache, explored Hughes Bay in the Antarctic summer of 1898–99, penetrated the ice-pack and reached 71° 36′ S. in 87½° W. The ship remained fast in drifting ice for a whole year, and her crew were the first to winter south of the Antarctic circle. The German Deep-Sea Expedition, under Chun, visited the Antarctic seas in 1898, reaching 64° 14′ S. north of Enderby Land. A British expedition in the *Southern Cross* was sent out in 1898 by Sir George Newnes, under Borchgrevink, who wintered at Cape Adare in 1899, and in 1900 succeeded in reaching 78° 50′ S., to the east of Mount Erebus. On January 1, 1903, Captain R. F. Scott, sledging southward from the *Discovery*, which had wintered in Macmurdo Strait, carried the British flag to 82° 17′ S, the highest south latitude yet attained. His expedition sailed for the Antarctic regions in 1901, simultaneously with a German expedition on the *Gauss* under Dr. E. von Drygalski, which entered the ice south of Kerguelen. A Swedish expedition, under Dr. Otto Nordenskiold, spent the years 1902–3 south of the Falkland Islands; and the *Scotia*, under the command of Mr. W. S. Bruce, explored Weddell Sea in 1903, and discovered a snowy coast named Coats Land. Mr. Shackleton in the *Nimrod* resumed exploration in 1907.

Antarctic Land.—Looking upon the land sighted or explored at various points (Victoria Land, Wilkes Land, Kemp Land, Enderby Land, Graham Land, and Alexander I. Land), as forming part of one and the same land-mass, it has been estimated that the Antarctic continent (Antarctica) has an area greater than that of Australia, or nearly four million square miles. The form and structure of the Antarctic icebergs show that they have been formed on large land-surfaces, and the rock fragments and *débris*, scattered over the floor of the Southern Ocean as these icebergs melt while floating towards the north, belong to lithological types characteristic of continental land, including gneiss, granite, mica-schist, quartziferous diorite, grained quartzite, sandstone, limestone, and shale. D'Urville descibes rocky islets off Adélie Land composed of granite and gneiss; Wilkes found on an iceberg near the same place boulders of red sandstone

and basalt; Chun dredged up a mass of red sandstone weighing 5 cwt. north of Enderby Land. Borchgrevink and Bull brought home fragments of mica-schist and other continental rocks from Cape Adare in 1895; Donald brought back from Joinville Island pieces of red jasper or chert; while Larsen brought from Seymour Island pieces of fossil coniferous wood and fossil Molluscan shells closely resembling species from the lower Tertiary of Britain and Patagonia. All these geological finds indicate continental land. The ranges of mountains and peaks discovered by Ross in Victoria Land appear to be formed of ancient crystalline rocks, with volcanic cones towards the south, 7,000 to 15,000 feet in height, Mount Erebus (160 miles to the west of which Ross believed the south magnetic pole to be situated) being in active eruption at the time of his visit; Larsen visited one of several active volcanoes to the south of Cape Horn.

Antarctic Ice.—The icebergs of the Antarctic differ entirely from those of the Arctic regions. When observed near their origin, they are found to be huge, flat-topped, perpendicular-sided, floating ice-islands, sometimes many miles in length, having a thickness of from 1,200 to 1,500 feet, of which about one-sixth or one-seventh projects above the level of the sea, the great mass of the berg being below sea-level. They have frequently a stratified or laminated structure, and have undoubtedly been broken off and floated away from a great ice-barrier or ice-wall, like that along which Ross sailed for 300 miles about lat. 78° S. This ice-barrier is evidently the sea-face of an enormous glacier or ice-cap creeping slowly over the low-lying lands of the Antarctic continent towards the sea. When this ice-cap is pushed into depths of 200 or 300 fathoms portions are broken off and form the table-shaped icebergs, which on being floated to the north and becoming disintegrated may assume various shapes. Where the coasts of the Antarctic continent are occupied by high mountain ranges, as for instance, off the east coast of Victoria Land, the seaward face of the pack-ice is only 10 to 20 feet high, and at Cape Adare a landing was effected on a pebbly beach, occupied by a penguin rookery, where no land-ice descended to the sea. There have been many speculations about the thickness of the ice over the Antarctic continent towards the South Pole, Croll believing that it might be as much as 12 to 24 miles. It is, however, extremely improbable that ice of this thickness exists.

Atmospheric Pressure and Temperature.—Our knowledge of the atmospheric conditions in the Antarctic is very meagre, being derived from few observations mainly during the southern summer, but these seem to indicate that there is a girdle of low atmospheric pressure, south of the 45th parallel of south latitude, and outside of the ice-bound region, with a mean pressure of less than 29 inches, accompanied by strong westerly and north-westerly winds and large rainfall. The extreme south polar area appears to be occupied by a vast permanent anticyclone, much more extensive in winter than in summer, out of which south-easterly winds blow from the pole towards the girdle of low pressure. Ross's

barometric observations indicate a gradual rise in the pressure south of lat. 75° S. As regards the temperature of the air, it is evidently, even in summer, extremely low, the mean of all the observations taken by Ross to the south of lat. 63° S. being 28.7° F., and his maximum 43.5° F. The winter minimum reported at Cape Adare or by the *Belgica* in 71° 30′ S. was —45° F., but the *Discovery* found —62°. The atmosphere is apparently dry over the ice-covered land, the moisture separating in the form of small snow-crystals, while farther north the air is often near the point of saturation, and more moisture is precipitated.

The Antarctic Ocean.—The temperature of the surface waters of the Antarctic Ocean appears to be higher in summer than that of the air. Thus Ross's observations south of lat. 63° S. give a mean daily temperature of 29.8° F. (compared with 28.7° F. for the air), varying from 27.3° to 33.6° F. Below the surface of the sea the *Challenger* observations show that in summer there is a wedge-shaped stratum of cold water sandwiched between warmer water at the surface and at the bottom. This stratum was traced from 65° to 53° S., and had a temperature at the southern thick end of the wedge of 28° F., and at the northern thin end of 32.5°, while that of the overlying water varied from 29° F. in the south to 38° F. in the north, and that of the underlying water from 32° to 35° F. In fact the whole of the water in the greater depths of the Antarctic Ocean has a temperature of 32° to 35° F., being pretty much the same as the temperature of the deepest bottom water throughout the great ocean basins, even in the tropics. The *Valdivia* found in 64° S. a mass of comparatively warm water of high salinity sandwiched between colder layers of deep and superficial water. The annual range of temperature in the waters within the pack-ice area never appears to exceed 10° F.

The available data for the depth of the Southern and Antarctic Oceans indicate a gradual shoaling from deep water towards the Antarctic continent, although between the latitudes of the Cape of Good Hope and of Kerguelen depths ranging from 2,500 to 3,100 fathoms were found by the *Valdivia* between 55° and 64° S. To the south-east of South Georgia, Bruce showed that Ross's sounding of 4,000 fathoms was erroneous; but south of Australia the *Challenger* found depths of 2,600 and 1,950 fathoms, and nearer the Antarctic circle depths of 1,800, 1,300, and 1,260 fathoms; Wilkes sounded in 500 and 800 fathoms off Adélie Land; Ross had soundings of 100 to 500 fathoms off Victoria Land; and depths of 164 to 480 fathoms have been recorded east of Joinville Island. The *Belgica* found depths under 200 fathoms in the pack west of Palmer Land.

Our knowledge of the Antarctic marine deposits is derived from the *Challenger* soundings, the observations of Hooker with Ross's expedition, and the soundings of the *Valdivia*. The deposit in the far south, surrounding the Antarctic continent, is Blue Mud, containing glauconite, composed mostly of land-detritus, mixed with remains of pelagic and bottom-living organisms. To the north of this Blue Mud, there is apparently a con-

inuous circumpolar band of Diatom Ooze, made up principally of the frustules of diatoms which lived in the surface waters, along with pelagic shells and some land-débris dropped by floating icebergs. This Diatom Ooze when dried is usually pure white or cream coloured, and looks not unlike chalk. Northwards of the Diatom Ooze the deposit is Globigerina Ooze, consisting mostly of the shells of pelagic Foraminifera, passing in very deep water into the characteristic deep-sea deposit Red Clay, associated with manganese nodules, sharks' teeth, and ear-bones of whales.

Marine Fauna and Flora.—Marine life, in the surface, intermediate and bottom waters of the south Polar sea, is very prolific. Pelagic Algæ, especially Diatoms, abound in the upper layers to the depth of 50 fathoms, forming an abundant food supply for the pelagic animals, such as Copepods, Amphipods, and Molluscs, &c., and for the animals living at the bottom. Pelagic calcareous organisms, like the Pteropods and Foraminifera, which are so numerous, both in species and individuals, in the surface waters of the tropics, become less and less abundant towards the Polar seas.

Of the shallow-water bottom-living (benthonic) fauna of the Antarctic, we have information only in the case of the more northerly islands, like Kerguelen, Bouvet, and South Georgia, but the available observations seem to indicate that in the shallow waters around Antarctic lands, in depths less than 25 fathoms, life is not so abundant as in depths of 100 fathoms and more. The deep-sea fauna of the Antarctic region has been shown by the *Challenger* to be exceptionally rich, a much larger number of species having been obtained than in any other region visited by that expedition, and the *Valdivia*'s dredgings in 1898 confirm this. In the cold waters of the Antarctic there is a very feeble development of shells and other calcareous structures in marine organisms when compared with what obtains in tropical waters. As with the pelagic organisms, so in the case of the benthonic fauna, a great many species and genera are recorded from the colder waters towards both the north and south Polar seas which are unknown in the intervening tropical area. The pelagic larvæ of benthonic animals are almost unknown in Polar waters, where most of the bottom-living species appear to have a direct development; this has been directly observed in several species of Echinoderms and Crustaceans in the cold waters of both hemispheres.

Antarctic Mammals and Birds.—There are many whales in the great Southern and Antarctic oceans, some of which appear to be closely allied to if not identical with those in the Arctic seas. The right whale (*Balæna mysticetus*) is not found in the south, but a small whalebone whale which has been described under the names *B. australis* and *B. novæ-zealandiæ* seems to be identical with *Balæna biscayensis* of the northern hemisphere. The humpback and rorqual whales appear to be identical with those in northern seas, and the same may be said of the grampuses, pilot whales, ziphioid whales, and dolphins. Thirteen species of seals are known from the Antarctic. Of these *Macrorhinus leoninus* is supposed by

some naturalists to be identical with the *Macrorhinus* from the coasts of California. The sea lion (*Otaria jubata*) is widespread in the Antarctic, but is now much less abundant than formerly. The fur seals belong to the same genera as the North Pacific species. The penguins are the most characteristic birds of the Antarctic, and some species exist in prodigious numbers—their rookeries being found on nearly all the islands and points of land free from land ice. The discovery of a penguin rookery at Cape Adaie is most important for the future of Antarctic exploration, for it shows that there is open water every year, and an abundant supply of food and fuel. The peculiar sheath-bill (*Chionis*) is usually found in all penguin rookeries. The albatrosses and other Procellaridæ are most abundant and breed in almost all the Antarctic Islands, together with terns, skuas, and gulls. The southern skua (*Stercorarius antarcticus*) appears to be identical with the Arctic species. On Kerguelen a small teal (*Querquedula eatoni*) is most abundant. Fishes have nowhere been observed in abundance in the waters of the Antarctic, although fish remains are most frequent in the stomachs of penguins and seals. The naturalists of the *Belgica* and of the *Southern Cross* collected a few insects as well as mosses or lichens in the most southerly lands. It is unlikely that any land mammals exist on the Antarctic continent.

What Remains to be Done.—From a geographical point of view much remains to be done in defining the topography of the land and the sea-floor within the Antarctic circle. This is by far the largest absolutely unknown area now remaining on the Earth. Our knowledge of the physical and biological conditions of high southern latitudes is most fragmentary, and it is satisfactory to know that the exploration of this great unknown region is now being seriously undertaken by civilised and progressive nations. It cannot be doubted that a successful exploration of the Antarctic would make a great advance in the philosophy of terrestrial science.

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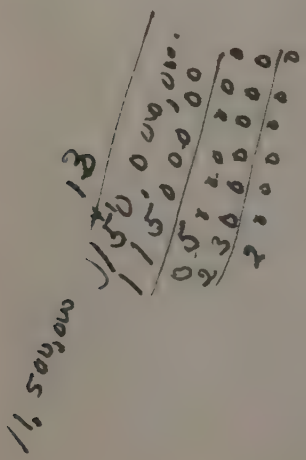

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